

LOCKHEED
MAINTENANCE MANUAL

CHAPTER 32

LIST OF EFFECTIVE TEMPORARY REVISIONS

FOLLOWING IS A COMPLETE LISTING OF ALL ACTIVE TEMPORARY REVISIONS (TR'S). TR'S NOT LISTED SHOULD BE REMOVED. THE ATA NUMBER, CONFIG CODE AND PAGE NUMBER IDENTIFIES THE PAGE PRECEDING THE TR.

TR NUMBER	ATA NUMBER	CONFIG CODE	PAGE NUMBER	TR DATE
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NONE

CHAPTER 32LANDING GEARLIST OF EFFECTIVE PAGES

<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>	<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>
List of Effective Pages	1	Jun 15/96			26	Nov 15/86	
	2	Jun 15/96					
	3	Jun 15/96		32-contr	1	Dec 15/93	
	4	Jun 15/96		32-contr	2	Nov 15/87	
	5	Jun 15/96		32-contr	3	Nov 15/82	
	6	Jun 15/96		32-contr	4	Nov 15/88	
	7	Jun 15/96		32-contr	5	Jun 15/95	
	8	Jun 15/96		32-contr	6	Dec 15/93	
	9	Jun 15/96		32-contr	7	Nov 15/84	
	10	Jun 15/96		32-contr	8	Nov 15/84	
	11	Jun 15/96		32-DIAGM	1	May 15/82	
	12	Jun 15/96		32-DIAGM	2	May 15/82	
	13	Jun 15/96		32-DIAGM	3	May 15/82	
	14	Jun 15/96		32-DIAGM	4	Nov 15/84	
	15	Jun 15/96		32-DIAGM	5/6	Dec 15/95	
	16	Jun 15/96		32-DIAGM	7	Nov 15/87	
Table of Contents	1	May 15/89		32-DIAGM	8	Nov 15/84	
	2	May 15/85		32-DIAGM	9	Nov 15/84	
	3	May 15/85		32-DIAGM	10	Nov 15/88	
	4	Nov 15/89		32-DIAGM	11	Nov 15/84	
	5	Dec 15/93		32-DIAGM	12	Nov 15/84	
	6	May 15/89		32-INDEX	1	Dec 15/93	
	7	May 15/82		32-INDEX	2	Dec 15/95	
	8	Dec 15/93		32-INDEX	3	Nov 15/84	
	9	Dec 15/95		32-INDEX	4	Nov 15/84	
	10	May 15/89		32-INDEX	5	Nov 15/87	
	11	Dec 15/93		32-INDEX	6	Nov 15/87	
	12	Nov 15/82		32-INDEX	7	Nov 15/87	
	13	May 15/89		32-INDEX	8	Nov 15/87	
	14	May 15/89		32-INDEX	9	Nov 15/87	
	15	May 15/89		32-INDEX	10	Nov 15/88	
	16	Nov 15/83		32-INDEX	11	Nov 15/88	
	17	May 15/89		32-INDEX	12	May 15/90	
	18	May 15/89		32-INDEX	13	Dec 15/92	
	19	May 15/89		32-INDEX	14	Nov 15/88	
	20	Mar 15/91		32-INDEX	15/16	Nov 15/88	
	21	Dec 15/93		32-00-00	1	Aug 15/81	
	22	Nov 15/82		32-00-00	2	Dec 1/71	
	23	Mar 15/91		32-00-00	3/4	Dec 1/71	
	24	May 15/89		32-00-00	5	Dec 1/72	
	25	Dec 15/93		32-00-00	6	Dec 1/72	
				32-00-00	7/8	Dec 1/72	

List of Effective Pages
Page 1
Jun 15/96



MAINTENANCE MANUAL

<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>	<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>
32-00-00	9/10	Dec 1/72		32-11-00	501	May 15/85	
32-00-00	11/12	Dec 1/72		32-11-00	502	May 15/85	
32-00-00	13	Sep 15/73		32-11-00	503	Nov 15/76	
32-00-00	14	Aug 15/81		32-11-00	504	Nov 15/76	
32-00-00	15	Dec 1/72		32-11-00	505	Nov 15/76	
32-00-00	16	Mar 15/73		32-11-00	506	Nov 15/76	
32-00-00	17	Sep 15/73		32-11-00	507/508	Nov 15/76	
32-00-00	18	Aug 15/82		32-11-01	401/402	May 15/82	
32-00-00	19/20	Aug 15/81		32-11-02	401	May 15/85	
32-00-00	21/22	Sep 15/80		32-11-02	402	Dec 15/93	
32-00-00	23/24	Sep 15/80		32-11-02	403	May 15/85	
32-00-00	25/26	Aug 15/81		32-11-02	404	May 15/85	
32-00-00	27/28	Aug 15/81		32-11-02	405	Aug 15/75	
32-00-00	29/30	Aug 15/81		32-11-02	406	May 15/85	
32-00-00	201	Aug 15/82		32-11-02	407	Aug 15/75	
32-00-00	202	Aug 15/82		32-11-02	408	Aug 15/75	
32-00-00	203/204	Aug 15/82		32-11-02	409	Aug 15/75	
32-10-00	1	Nov 15/84		32-11-02	410	Aug 15/75	
32-10-00	2	Jul 15/84		32-11-02	411	May 15/88	
32-10-00	3	Nov 15/76		32-11-02	412	May 15/86	
32-10-00	4	Nov 15/76		32-11-02	413	May 15/86	
32-10-00	5	Nov 15/76		32-11-02	414	Dec 15/93	
32-10-00	6	Nov 15/76		32-11-02	415	May 15/82	
32-10-00	7	Feb 15/76		32-11-02	416	May 15/88	
32-10-00	8	Feb 15/76		32-11-02	417	May 15/88	
32-10-00	9	Jul 15/84		32-11-02	418	Aug 15/82	
32-10-00	10	Jul 15/84		32-11-02	419	Dec 15/93	
32-10-00	11/12	Jul 15/84		R 32-11-02	420	Jun 15/96	
32-10-00	101	Nov 15/82		32-11-02	421/422	Dec 15/93	
32-10-00	102	Nov 15/82		32-11-02	601	Aug 15/82	
32-10-00	103	Nov 15/82		32-11-02	602	Aug 15/82	
32-10-00	104	Nov 15/82		32-11-02	603	Aug 15/82	
32-10-00	201/202	Aug 15/75		32-11-02	604	Aug 15/82	
32-11-00	1	Nov 15/84		32-11-02	801	May 15/85	
32-11-00	2	Aug 15/81		32-11-02	802	Aug 15/82	
32-11-00	3	Feb 15/75		32-11-02	803	Nov 15/84	
32-11-00	4	Feb 15/74		32-11-02	804	May 15/75	
32-11-00	5	Dec 1/72		32-11-02	805/806	May 15/75	
32-11-00	6	Dec 1/72		32-11-02	807	Nov 15/84	
32-11-00	7/8	Aug 15/77		32-11-02	808	Aug 15/77	
32-11-00	9/10	Aug 15/77		32-11-02	809	Aug 15/77	
32-11-00	11	Aug 15/77		32-11-02	810	Nov 15/89	
32-11-00	12	Jun 15/79		32-11-02	811	Nov 15/89	
32-11-00	13	Aug 15/77		32-11-02	812	Nov 15/89	
32-11-00	14	Aug 15/82		32-11-02	813/814	Dec 15/94	
32-11-00	15	Aug 15/77		32-11-02	815	Nov 15/89	
32-11-00	16	Aug 15/77		32-11-02	816	Nov 15/89	
32-11-00	17/18	May 15/85		32-11-02	817	Nov 15/89	



<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>	<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>
32-11-02	818	Nov 15/89		32-11-11	408	May 15/85	
32-11-02	819/820	Nov 15/89		32-11-11	409/410	May 15/74	
32-11-03	401	May 15/85		32-11-11	411	May 15/85	
32-11-03	402	May 15/85		32-11-11	412	May 15/85	
32-11-03	403	May 15/85		32-11-12	401	May 15/85	
32-11-03	404	May 15/85		32-11-12	402	May 15/85	
32-11-03	405/406	May 15/85		32-11-12	403	Dec 1/72	
32-11-03	407/408	Dec 15/94		32-11-12	404	May 15/85	
32-11-03	409/410	Nov 15/84		32-11-12	405	Dec 1/72	
32-11-03	411	May 15/85		32-11-12	406	May 15/85	
32-11-03	412	Nov 15/86		32-11-12	407/408	May 15/85	
32-11-03	413	May 15/85		32-11-13	401	May 15/85	
32-11-03	414	May 15/85		32-11-13	402	May 15/85	
32-11-04	401	May 15/85		32-11-13	403	May 15/85	
32-11-04	402	Aug 15/81		32-11-13	404	Aug 15/74	
32-11-04	403	Aug 15/81		32-11-13	405/406	May 15/77	
32-11-04	404	May 15/85		32-11-13	407/408	May 15/77	
32-11-04	405	Aug 15/75		32-11-13	409	May 15/85	
32-11-04	406	May 15/85		32-11-13	410	May 15/85	
32-11-04	407/408	May 15/85		32-11-13	411	Nov 15/85	
32-11-04	601	Nov 15/89		32-11-13	412	Nov 15/85	
32-11-04	602	Nov 15/89		32-11-13	413	Sep 15/80	
32-11-06	401	May 15/86		32-11-13	414	Nov 15/85	
32-11-06	402	May 15/86		32-11-13	415	Nov 15/85	
32-11-06	403/404	May 15/86		32-11-13	416	Nov 15/85	
32-11-06	601	Mar 15/83		32-11-13	417/418	Nov 15/85	
32-11-06	602	Mar 15/83		32-11-14	401	May 15/85	
32-11-07	401	May 15/85		32-11-14	402	May 15/85	
32-11-07	402	Nov 15/83		32-11-14	403	May 15/90	
32-11-07	403/404	Nov 15/77		32-11-14	404	May 15/85	
32-11-08	401	May 15/85		32-11-14	405	May 15/90	
32-11-08	402	Jun 15/95		32-11-14	406	May 15/90	
32-11-08	403	May 15/87		32-11-17	601	May 15/86	
32-11-08	404	May 15/87		32-11-17	602	May 15/86	
32-11-08	405	Jul 15/83		32-11-17	603	May 15/86	
32-11-08	406	May 15/87		32-11-17	604	May 15/86	
32-11-08	407/408	Nov 15/83		32-11-17	605	May 15/86	
32-11-08	601/602	Dec 15/92		32-11-17	606	May 15/86	
32-11-10	401	May 15/85		32-11-19	401	May 15/85	
32-11-10	402	Feb 15/74		32-11-19	402	May 15/85	
32-11-10	601	Jun 15/79		32-11-19	403/404	May 15/85	
32-11-10	602	Nov 15/73		32-11-20	401	May 15/85	
32-11-11	401	May 15/85		32-11-20	402	May 15/76	
32-11-11	402	May 15/85		32-11-20	403	Aug 15/81	
32-11-11	403	May 15/74		32-11-20	404	Nov 15/77	
32-11-11	404	May 15/85		32-11-20	405/406	Nov 15/77	
32-11-11	405/406	May 15/77		32-11-26	401	Aug 15/77	
32-11-11	407	May 15/85		32-11-26	402	Aug 15/81	

List of Effective Pages

Page 3

Jun 15/96



MAINTENANCE MANUAL

<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>	<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>
32-11-26	403	Aug 15/81		32-12-03	402	Nov 15/82	2
32-11-26	404	Jul 15/84		32-12-03	403/404	Sep 15/79	2
32-11-26	405	Jul 15/83		32-12-03	501	Sep 15/79	1
32-11-26	406	Nov 15/88		32-12-03	502	Jun 15/95	1
32-11-27	401	Nov 15/86		32-12-03	503/504	Sep 15/79	1
32-11-27	402	Dec 15/95		32-12-03	505	Jun 15/95	1
32-11-27	403	Nov 15/86		32-12-03	506	Jun 15/95	1
32-11-27	404	Jun 15/80		32-12-03	507/508	Sep 15/79	1
32-11-27	405/406	Sep 15/79		32-12-03	509	Jun 15/95	1
32-12-01	401	May 15/85		32-12-03	510	Jun 15/95	1
32-12-01	402	Aug 15/81		32-12-03	501	May 15/85	2
32-12-01	403	Nov 15/88		32-12-03	502	Jun 15/95	2
32-12-01	404	Sep 15/79		32-12-03	503	Jun 15/95	2
32-12-01	405	Mar 15/91		32-12-03	504	Dec 15/92	2
32-12-01	406	Mar 15/91		32-12-03	505/506	May 15/85	2
32-12-01	407/408	Aug 15/81		32-12-03	507	Jun 15/95	2
32-12-01	501	May 15/82		32-12-03	508	Dec 15/92	2
32-12-01	502	Nov 15/88		32-12-03	509/510	Dec 15/92	2
32-12-01	503/504	Nov 15/88		32-12-03	601/602	Aug 15/78	
32-12-01	505/506	Mar 15/80		32-12-05	401	May 15/85	
32-12-01	507	Nov 15/88		32-12-05	402	May 15/85	
32-12-01	508	Nov 15/88		32-12-05	403	Mar 15/81	
32-12-01	509/510	Nov 15/88		32-12-05	404	May 15/85	
32-12-02	401	Jun 15/94		32-12-07	401	May 15/85	
32-12-02	402	Jun 15/94		32-12-07	402	Aug 15/82	
32-12-02	403	Jun 15/94		32-12-07	403/404	Aug 15/82	
32-12-02	404	Jun 15/94		32-12-07	405/406	May 15/85	
32-12-02	405/406	Jun 15/94		32-13-00	501/502	May 15/73	
32-12-02	501	Jun 15/94		32-20-00	1	Dec 1/71	
32-12-02	502	Jun 15/95		32-20-00	2	Dec 1/71	
32-12-02	503/504	Jun 15/94		32-20-00	101	Nov 15/82	
32-12-02	505	Jun 15/94		32-20-00	102	Nov 15/82	
32-12-02	506	Jun 15/95		32-20-00	103	Nov 15/82	
32-12-02	507	Jun 15/95		32-20-00	104	Nov 15/82	
32-12-02	508	Jun 15/95		32-21-00	1	Jul 15/84	
32-12-02	601	Nov 15/78	1	32-21-00	2	Jul 15/84	
32-12-02	602	Nov 15/78	1	32-21-00	3	Feb 15/74	
32-12-02	603/604	Nov 15/78	1	32-21-00	4	Jul 15/84	
32-12-02	601/602	Nov 15/78	2	32-21-00	5/6	Jul 15/84	
32-12-03	401	Jul 15/83	1	32-21-00	7/8	Feb 15/74	
32-12-03	402	Aug 15/82	1	32-21-01	401/402	Nov 15/82	
32-12-03	403	Dec 15/93	1	32-21-02	401	Dec 15/93	
32-12-03	404	Dec 15/93	1	32-21-02	402	Jun 15/92	
32-12-03	405/406	Sep 15/79	1	32-21-02	403	Jun 15/92	
32-12-03	407	Jul 15/83	1	32-21-02	404	Aug 15/82	
32-12-03	408	Jul 15/83	1	32-21-02	405	Nov 15/75	
32-12-03	409/410	Sep 15/79	1	32-21-02	406	Jun 15/92	
32-12-03	401	Dec 15/93	2	32-21-02	407	Nov 15/75	



MAINTENANCE MANUAL

<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>	<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>
32-21-02	408	Aug 15/75		32-21-10	401	May 15/85	
32-21-02	409	Nov 15/75		32-21-10	402	May 15/85	
32-21-02	410	Nov 15/75		32-21-10	403/404	Aug 15/78	
32-21-02	411	Jul 15/84		32-21-11	401	Aug 15/82	
32-21-02	412	Jul 15/84		32-21-11	402	Aug 15/82	
32-21-02	413	Jul 15/84		32-21-11	403	Aug 15/81	
32-21-02	414	Jul 15/84		32-21-11	404	Aug 15/81	
32-21-02	415	Jun 15/92		32-21-12	401	Aug 15/82	
32-21-02	416	Jul 15/84		32-21-12	402	Aug 15/82	
32-21-02	417	Jul 15/84		32-21-15	401	Aug 15/81	
32-21-02	418	Jul 15/84		32-21-15	402	May 15/82	
32-21-02	419	Jun 15/92		32-21-15	403/404	Aug 15/81	
32-21-02	420	Jun 15/92		32-21-16	401	May 15/85	
32-21-02	421	Jun 15/92		32-21-16	402	Aug 15/81	
32-21-02	422	Jun 15/92		32-21-16	403/404	May 15/76	
32-21-02	801	May 15/89		32-22-01	401	Nov 15/85	
32-21-02	802	Jul 15/84		32-22-01	402	Nov 15/85	
32-21-02	803	Aug 15/77		32-22-01	403/404	Dec 1/72	
32-21-02	804	Aug 15/77		32-22-01	501	May 15/89	
32-21-02	805	Aug 15/77		32-22-01	502	Jul 15/83	
32-21-02	806	Nov 15/81		32-22-01	503/504	Jul 15/83	
32-21-02	807	Jul 15/84		32-22-01	505/506	May 15/82	
32-21-02	808	May 15/75		32-22-02	401	May 15/85	
32-21-02	809	Jul 15/84		32-22-02	402	May 15/85	
32-21-02	810	Jul 15/84		32-22-02	403/404	Dec 1/72	
32-21-02	811	May 15/88		32-22-02	501	Aug 15/82	
32-21-02	812	Jul 15/84		32-22-02	502	Nov 15/81	
32-21-02	813	Jul 15/84		32-22-02	503	Dec 15/80	
32-21-02	814	Jul 15/84		32-22-02	504	Aug 15/81	
32-21-02	815/816	Jul 15/84		32-30-00	1/2	Apr 1/72	
32-21-02	817/818	Aug 15/82		32-30-00	101	Mar 15/81	
32-21-03	401	May 15/85		32-30-00	102	Mar 15/81	
32-21-03	402	May 15/82		32-30-00	103/104	Nov 15/88	
32-21-03	403/404	Feb 15/74		32-30-00	105/106	Nov 15/88	
32-21-03	405	Feb 15/74		32-30-00	107/108	Nov 15/88	
32-21-03	406	May 15/82		32-30-00	109	Dec 15/93	
32-21-03	407	Feb 15/74		32-30-00	110	Nov 15/88	
32-21-03	408	Aug 15/81		32-30-00	111/112	Nov 15/88	
32-21-04	401	May 15/85		32-30-00	113/114	Nov 15/88	
32-21-04	402	May 15/85		32-30-00	115	Nov 15/88	
32-21-04	403/404	Aug 15/78		32-30-00	116	Nov 15/88	
32-21-04	405	May 15/85		32-30-00	117	Nov 15/88	
32-21-04	406	May 15/85		32-30-00	118	Nov 15/88	
32-21-05	401	May 15/85		32-30-00	119	Dec 15/93	
32-21-05	402	May 15/85		32-30-00	120	Nov 15/88	
32-21-05	403/404	May 15/85		32-30-00	121	Nov 15/88	
32-21-09	401	Dec 1/72		32-30-00	122	Nov 15/88	
32-21-09	402	Apr 1/72		32-30-00	123/124	Nov 15/38	

List of Effective Pages

Page 5

Jun 15/96



MAINTENANCE MANUAL

<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>	<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>
32-30-00	125/126	Nov 15/88		32-31-02	503/504	Nov 15/84	
32-30-00	201	May 15/85		32-31-04	401	Jul 15/73	
32-30-00	202	May 15/85		32-31-04	402	Jul 15/73	
32-30-00	203/204	May 15/82		32-31-05	401	Jul 15/73	
32-30-00	501	Nov 15/84		32-31-05	402	Jul 15/73	
32-30-00	502	Nov 15/84		32-31-06	401	Oct 1/72	
32-30-00	503	Nov 15/84		32-31-06	402	May 15/85	
32-30-00	504	Aug 15/82		32-31-06	403/404	Apr 1/72	
32-30-00	505	May 15/89		32-31-08	401	Jul 15/83	
32-30-00	506	Nov 15/88		32-31-08	402	Jul 15/83	
32-30-00	507	Aug 15/81		32-31-10	401	Aug 15/77	
32-30-00	508	Nov 15/84		32-31-10	402	Aug 15/77	
32-30-00	509	May 15/89		32-31-10	403/404	Apr 1/72	
32-30-00	510	Aug 15/81		32-31-11	401	May 15/85	
32-30-00	511	Aug 15/82		32-31-11	402	May 15/85	
32-30-00	512	Nov 15/84		32-31-14	201/202	May 15/82	
32-30-00	513	Nov 15/84		32-31-14	401	Jun 15/92	
32-30-00	514	Nov 15/84		32-31-14	402	Jun 15/92	
32-30-00	515	Nov 15/84		32-31-14	403	Jun 15/92	
32-30-00	516	Nov 15/84		32-31-14	404	Jun 15/92	
32-31-00	1	Nov 15/88		32-31-15	401	Sep 15/79	
32-31-00	2	Sep 15/79		32-31-15	402	Sep 15/79	
32-31-00	3	Sep 15/79		32-31-15	403/404	Nov 15/88	
32-31-00	4	Nov 15/88		32-31-16	201	Jun 15/93	
32-31-00	5/6	May 15/87		32-31-16	202	Jun 15/92	
32-31-00	7/8	Nov 15/83		32-31-16	203	Jun 15/93	
32-31-00	9	Jul 15/83		32-31-16	204	Jun 15/93	
32-31-00	10	Nov 15/88		32-31-16	205	Jun 15/93	
32-31-00	11	Dec 15/93		32-31-16	206	Jun 15/93	
32-31-00	12	Dec 15/93		32-31-16	401	Nov 15/88	
32-31-00	13	Dec 15/93		32-31-16	402	Nov 15/88	
32-31-00	14	Dec 15/93		32-31-16	403/404	Nov 15/88	
32-31-00	15/16	Mar 15/84		32-31-18	401	Dec 15/79	
32-31-00	17/18	Nov 15/88		32-31-18	402	Dec 15/79	
32-31-01	401	Jul 15/83		32-32-00	1	May 15/82	
32-31-01	402	Aug 15/82		32-32-00	2	May 15/82	
32-31-01	403	Dec 15/92		32-32-00	3	May 15/82	
32-31-01	404	Jul 15/83		32-32-00	4	May 15/82	
32-31-01	405	Jul 15/83		32-32-00	5	Feb 15/77	
32-31-01	406	Jul 15/83		32-32-00	6	Dec 1/71	
32-31-01	407	Jul 15/83		32-32-00	7	May 15/82	
32-31-01	408	Jun 15/80		32-32-00	8	Feb 15/77	
32-31-02	201/202	May 15/82		32-32-00	9/10	Feb 15/77	
32-31-02	401	May 15/82		32-32-00	201	Nov 15/77	
32-31-02	402	May 15/82		32-32-00	202	May 15/82	
32-31-02	403/404	Apr 1/72		32-32-00	203	May 15/82	
32-31-02	501	Nov 15/86		32-32-00	204	Nov 15/86	
32-31-02	502	May 15/88		32-32-00	205/206	Nov 15/86	

List of Effective Pages

Page 6

Jun 15/96



MAINTENANCE MANUAL

<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>	<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>
32-32-01	401	Dec 15/93		32-33-01	402	Mar 15/84	
32-32-01	402	Mar 15/91		32-33-01	403/404	May 15/82	
32-32-01	403	Sep 15/79		32-33-01	405/406	May 15/82	
32-32-01	404	Dec 15/91		32-33-01	407	Aug 15/82	
32-32-01	405/406	Mar 15/91		32-33-01	408	Nov 15/86	
32-32-02	401	Jun 15/94		32-33-02	401	May 15/74	
32-32-02	402	Jun 15/94		32-33-02	402	May 15/74	
32-32-02	403	Jun 15/94		32-33-02	403	May 15/74	
32-32-02	404	Jun 15/94		32-33-02	404	May 15/74	
32-32-02	405	Jun 15/94		32-33-04	401	Aug 15/81	
32-32-02	406	Jun 15/94		32-33-04	402	Dec 15/91	
32-32-03	401	Dec 15/93		32-33-04	403	Dec 15/91	
32-32-03	402	Aug 15/82		32-33-04	404	May 15/74	
32-32-03	403	Aug 15/82		32-33-05	401	Aug 15/81	
32-32-03	404	Aug 15/82		32-33-05	402	Nov 15/82	
32-32-03	405	Aug 15/81		32-33-05	403/404	Mar 15/73	
32-32-03	406	Aug 15/81		32-33-06	401	Aug 15/82	
32-32-03	601	May 15/86		32-33-06	402	Jul 15/83	
32-32-03	602	Jun 15/92		32-33-06	403	Jul 15/83	
32-32-03	603/604	May 15/86		32-33-06	404	Jul 15/83	
32-32-04	401	Nov 15/78		32-33-06	405/406	Jul 15/83	
32-32-04	402	Aug 15/81		32-33-06	407/408	Feb 15/75	
32-32-04	403	Aug 15/81		32-33-08	401	Mar 15/91	
32-32-04	404	Aug 15/81		32-33-08	402	Mar 15/91	
32-33-00	1	Jan 15/73		32-33-08	403/404	Nov 15/81	
32-33-00	2	Sep 15/79		32-33-09	401	Dec 15/93	
32-33-00	3	Dec 15/93		32-33-09	402	Dec 15/93	
32-33-00	4	Dec 1/71		32-33-09	403/404	Dec 15/93	
32-33-00	5/6	Mar 15/83		32-34-00	1	May 15/74	
32-33-00	7	Dec 1/71		32-34-00	2	May 15/73	
32-33-00	8	Dec 1/71		32-34-00	3	Dec 1/71	
32-33-00	9	Dec 1/71		32-34-00	4	Dec 1/71	
32-33-00	10	Dec 1/71		32-34-00	5	Dec 1/71	
32-33-00	11	Dec 15/93		32-34-00	6	May 15/73	
32-33-00	12	Dec 1/71		32-34-00	7/8	May 15/73	
32-33-00	13	Sep 15/79		32-34-01	401	Mar 15/84	
32-33-00	14	Dec 15/93		32-34-01	402	Mar 15/84	
32-33-00	15	Dec 15/93		32-34-01	403/404	Aug 15/82	
32-33-00	16	Dec 15/93		32-34-02	401	Nov 15/84	
32-33-00	17/18	Dec 15/93		32-34-02	402	Nov 15/84	
32-33-00	101	Mar 15/80		32-34-02	403	Nov 15/84	
32-33-00	102	Mar 15/80		32-34-02	404	Feb 15/79	
32-33-00	103/104	Mar 15/80		32-34-03	401	May 15/87	
32-33-00	201	Mar 15/81		32-34-03	402	May 15/87	
32-33-00	202	Nov 15/82		32-34-03	403/404	May 15/87	
32-33-00	203	Nov 15/75		32-34-04	401	Dec 15/93	
32-33-00	204	Nov 15/75		32-34-04	402	Aug 15/81	
32-33-01	401	Mar 15/84		32-34-04	403	Aug 15/81	

List of Effective Pages

Page 7

Jun 15/96



MAINTENANCE MANUAL

<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>	<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>
32-34-04	404	May 15/77		32-37-00	104	Mar 15/81	
32-34-05	401	Nov 15/77		32-37-00	105	Mar 15/81	
32-34-05	402	Aug 15/81		32-37-00	106	Mar 15/81	
32-34-05	403	Feb 15/78		32-37-00	201	Nov 15/81	
32-34-05	404	Feb 15/78		32-37-00	202	Nov 15/81	
32-34-05	405/406	Feb 15/78		32-37-00	501	Dec 15/92	
32-34-06	401	Dec 15/93		32-37-00	502	Mar 15/91	
32-34-06	402	Feb 15/77		32-37-00	503/504	Mar 15/91	
32-34-06	403	Aug 15/81		32-37-00	505/506	Mar 15/91	
32-34-06	404	Nov 15/77		32-37-00	507	Mar 15/91	
32-35-00	1	Feb 15/74		32-37-00	508	Mar 15/91	
32-35-00	2	Feb 15/74		32-37-00	509	Mar 15/91	
32-35-00	3/4	Feb 15/74		32-37-00	510	Mar 15/91	
32-35-01	401	Nov 15/82		32-37-00	511	Mar 15/91	
32-35-01	402	Nov 15/89		32-37-00	512	Dec 15/92	
32-35-01	403/404	Mar 15/83		32-37-00	513	Dec 15/92	
32-35-01	405/406	Mar 15/83		32-37-00	514	Dec 15/92	
32-36-00	1	May 15/82		32-37-00	515	Jun 15/93	
32-36-00	2	May 15/77		32-37-00	516	Mar 15/91	
32-36-00	3	Nov 15/84		32-41-00	1	Aug 15/81	
32-36-00	4	Dec 15/80		32-41-00	2	Dec 1/71	
32-36-00	5/6	May 15/77		32-41-00	3/4	Nov 15/84	
32-36-00	7/8	May 15/77		32-41-01	401	Nov 15/84	
32-36-00	9/10	May 15/77		32-41-01	402	Nov 15/84	
32-36-00	101	Mar 15/81		32-41-01	403	Nov 15/89	
32-36-00	102	Mar 15/81		32-41-01	404	Nov 15/89	
32-36-00	103/104	Mar 15/81		32-41-01	405	Nov 15/89	
32-36-00	105/106	Mar 15/81		32-41-01	406	Nov 15/85	
32-36-00	107	Mar 15/81		32-41-01	601	Dec 15/92	
32-36-00	108	Mar 15/81		32-41-01	602	Dec 15/92	
32-36-00	109	Nov 15/84		32-41-01	603	Dec 15/92	
32-36-00	110	Mar 15/81		32-41-01	604	Dec 15/92	
32-36-00	201	Jul 15/83		32-41-01	605	Dec 15/92	
32-36-00	202	Nov 15/87		32-41-01	606	Dec 15/92	
32-36-00	203	Nov 15/87		32-41-01	607	Dec 15/92	
32-36-00	204	Nov 15/87		32-41-01	608	Dec 15/92	
32-36-00	205/206	Feb 15/79		32-41-01	609	Dec 15/92	
32-36-01	401	May 15/77		32-41-01	610	Dec 15/92	
32-36-01	402	May 15/74		32-41-01	611	Dec 15/92	
32-36-01	403	May 15/77		32-41-01	612	Dec 15/92	
32-36-01	404	May 15/77		32-41-01	613	Dec 15/92	
32-37-00	1	May 15/82		32-41-01	614	Dec 15/92	
32-37-00	2	Dec 1/71		32-41-01	615	Dec 15/92	
32-37-00	3	May 15/77		32-41-01	616	Dec 15/92	
32-37-00	4	May 15/77		32-41-01	617	Dec 15/92	
32-37-00	101	Mar 15/81		32-41-01	618	Dec 15/92	
32-37-00	102	Mar 15/81		32-41-01	619	Dec 15/92	
32-37-00	103	Mar 15/81		32-41-01	620	Dec 15/92	



MAINTENANCE MANUAL

<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>	<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>
32-41-01	621	Dec 15/92		32-43-00	25	Aug 15/81	
32-41-01	622	Dec 15/92		32-43-00	26	Aug 15/81	
32-41-01	623	Dec 15/92		32-43-00	27	Aug 15/81	
32-41-01	624	Dec 15/92		32-43-00	28	Aug 15/81	
32-41-01	625	Dec 15/92		32-43-00	29/30	Aug 15/81	
32-41-01	626	Dec 15/92		32-43-00	101	Nov 15/84	
32-41-01	627	Dec 15/92		32-43-00	102	Mar 15/81	
32-41-01	628	Dec 15/92		32-43-00	103	Mar 15/81	
32-41-01	629	Dec 15/92		32-43-00	104	Mar 15/81	
32-41-01	630	Dec 15/92		32-43-00	105	Mar 15/81	
32-41-01	631	Dec 15/92		32-43-00	106	Mar 15/81	
32-41-01	632	Dec 15/92		32-43-00	107	Nov 15/87	
32-41-01	633	Dec 15/92		32-43-00	108	Nov 15/87	
32-41-01	634	Dec 15/92		32-43-00	109	Nov 15/87	
32-41-01	635	Dec 15/92		32-43-00	110	Nov 15/87	
32-41-01	636	Dec 15/92		32-43-00	111/112	Nov 15/87	
32-41-01	637	Dec 15/92		32-43-00	113/114	Nov 15/87	
32-41-01	638	Dec 15/92		32-43-00	115/116	Nov 15/87	
32-41-01	639	Dec 15/92		32-43-00	117/118	Nov 15/87	
32-41-01	640	Dec 15/92		32-43-00	201	Jul 15/83	
32-41-01	641	Dec 15/92		32-43-00	202	Jul 15/83	
32-41-01	642	Dec 15/92		32-43-00	203	Jul 15/83	
32-42-00	1	Jul 15/83		32-43-00	204	Jul 15/83	
32-42-00	2	Dec 1/71		32-43-00	501	Jul 15/84	1
32-42-01	401	Nov 15/84		32-43-00	502	Aug 15/81	1
32-42-01	402	May 15/88		32-43-00	503	Aug 15/81	1
32-42-01	403	Dec 15/91		32-43-00	504	Aug 15/81	1
32-42-01	404	Dec 15/91		32-43-00	505/506	Aug 15/81	1
32-42-01	405/406	Nov 15/86		32-43-00	507	Sep 15/73	1
32-43-00	1	May 15/82		32-43-00	508	Aug 15/81	1
32-43-00	2	May 15/82		32-43-00	509	Aug 15/81	1
32-43-00	3/4	Dec 1/71		32-43-00	510	Aug 15/81	1
32-43-00	5	Dec 1/71		32-43-00	511	Nov 15/88	1
32-43-00	6	Dec 1/71		32-43-00	512	Sep 15/80	1
32-43-00	7/8	Dec 1/71		32-43-00	501	Jul 15/84	2
32-43-00	9	Dec 1/71		32-43-00	502	May 15/85	2
32-43-00	10	Dec 1/72		32-43-00	503	Dec 15/94	2
32-43-00	11	May 15/85		32-43-00	504	Dec 15/94	2
32-43-00	12	May 15/82		32-43-00	505/506	Dec 15/94	2
32-43-00	13/14	Nov 15/86		32-43-00	507/508	Nov 15/88	2
32-43-00	15	May 15/82		32-43-00	509	Jul 15/83	2
32-43-00	16	May 15/82		32-43-00	510	Jul 15/83	2
32-43-00	17	Sep 15/79		32-43-00	511	Dec 15/94	2
32-43-00	18	Aug 15/81		32-43-00	512	Dec 15/94	2
32-43-00	19/20	Aug 15/81		32-43-00	513	Dec 15/94	2
32-43-00	21/22	Aug 15/81		32-43-00	514	Dec 15/94	2
32-43-00	23	Aug 15/81		32-43-00	515	Dec 15/94	2
32-43-00	24	Aug 15/81		32-43-00	516	Dec 15/94	2

List of Effective Pages

Page 9

Jun 15/96



MAINTENANCE MANUAL

CHAPTER/ SECTION	PAGE	DATE	CONFIG CODE	CHAPTER/ SECTION	PAGE	DATE	CONFIG CODE
32-43-00	517/518	Dec 15/94	2	32-43-11	402	Feb 15/78	
32-43-00	601	Dec 15/92		32-43-11	403	Aug 15/81	
32-43-00	602	May 15/82		32-43-11	404	Feb 15/78	
32-43-00	603	Jun 15/93		32-43-14	401	Aug 15/82	
32-43-00	604	Dec 15/93		32-43-14	402	Dec 15/80	
32-43-00	605	Jun 15/93		32-43-18	401	Aug 15/82	
32-43-00	606	Jun 15/93		32-43-18	402	May 15/82	
32-43-01	201	May 15/85		32-43-18	403	May 15/82	
32-43-01	202	May 15/85		32-43-18	404	May 15/82	
32-43-01	203/204	May 15/85		32-43-18	405/406	May 15/82	
32-43-01	401	Dec 15/93		32-43-18	407/408	Aug 15/78	
32-43-01	402	Nov 15/89		32-43-21	401	Nov 15/82	
32-43-01	403	Nov 15/89		32-43-21	402	Nov 15/82	
32-43-01	404	Dec 15/93		32-43-21	403/404	Nov 15/82	
32-43-01	405	Nov 15/89		32-43-22	401	May 15/76	
32-43-01	406	Jul 15/83		32-43-22	402	Aug 15/81	
32-43-02	401	Aug 15/81		32-43-22	403/404	May 15/76	
32-43-02	402	Aug 15/81		32-43-23	401	Nov 15/82	
32-43-02	403	May 15/77		32-43-23	402	May 15/82	
32-43-02	404	Aug 15/81		32-43-23	403/404	May 15/82	
32-43-02	405/406	Apr 15/73		32-44-00	1	Mar 15/81	
32-43-03	401	Feb 15/74		32-44-00	2	Dec 1/71	
32-43-03	402	Feb 15/74		32-44-00	3/4	Nov 15/82	
32-43-03	403/404	Dec 15/80		32-44-00	5/6	Nov 15/82	
32-43-04	401	Nov 15/88		32-44-00	7/8	Nov 15/82	
32-43-04	402	Nov 15/88		32-44-00	9/10	Nov 15/86	
32-43-04	403	Nov 15/88		32-44-00	11	Nov 15/82	
32-43-04	404	Nov 15/88		32-44-00	12	Nov 15/82	
32-43-04	405/406	Jul 15/84		32-44-00	13	Nov 15/82	
32-43-04	407/408	Jul 15/84		32-44-00	14	Nov 15/82	
32-43-04	409	Jul 15/84		32-44-00	15	Nov 15/82	
32-43-04	410	Jul 15/84		32-44-00	16	Nov 15/82	
32-43-06	401	Aug 15/81		32-44-00	17	Nov 15/82	
32-43-06	402	Jul 15/83		32-44-00	18	Nov 15/82	
32-43-06	403	Aug 15/81		32-44-00	19	Nov 15/82	
32-43-06	404	Jun 15/79		32-44-00	20	Nov 15/82	
32-43-06	405/406	Jun 15/73		32-44-00	21	Nov 15/82	
32-43-07	401	Aug 15/81		32-44-00	22	Nov 15/82	
32-43-07	402	Aug 15/81		32-44-00	23	Nov 15/82	
32-43-07	403	Aug 15/81		32-44-00	24	Nov 15/82	
32-43-07	404	Jun 15/79		32-44-00	25	Nov 15/82	
32-43-07	601	Aug 15/81		32-44-00	26	Nov 15/82	
32-43-07	602	Aug 15/81		32-44-00	27	Nov 15/82	
32-43-09	401	Aug 15/81		32-44-00	28	Nov 15/82	
32-43-09	402	Aug 15/81		32-44-00	29	Nov 15/82	
32-43-09	403	Dec 1/72		32-44-00	30	Nov 15/82	
32-43-09	404	May 15/73		32-44-00	31/32	Nov 15/82	
32-43-11	401	Aug 15/81		32-44-00	33	Nov 15/82	

List of Effective Pages
Page 10
Jun 15/96



MAINTENANCE MANUAL

<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>	<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>
32-44-00	34	Nov 15/82		32-44-07	401	Aug 15/81	
32-44-00	35	Nov 15/82		32-44-07	402	Aug 15/81	
32-44-00	36	Nov 15/82		32-44-07	403/404	May 15/74	
32-44-00	37	Nov 15/82		32-44-13	401	Feb 15/74	
32-44-00	38	Nov 15/82		32-44-13	402	Feb 15/74	
32-44-00	39	Nov 15/82		32-44-13	403/404	Dec 15/80	
32-44-00	40	Nov 15/82		32-44-14	401	Aug 15/81	
32-44-00	41	Nov 15/82		32-44-14	402	Aug 15/81	
32-44-00	42	Nov 15/82		32-44-14	403/404	Dec 1/72	
32-44-00	101	Mar 15/81		32-44-16	201	Sep 15/79	
32-44-00	102	Mar 15/81		32-44-16	202	Sep 15/79	
32-44-00	103	Mar 15/81		32-44-16	203/204	Sep 15/79	
32-44-00	104	Mar 15/81		32-44-16	401	Nov 15/82	
32-44-00	105	Mar 15/81		32-44-16	402	Nov 15/82	
32-44-00	106	Mar 15/81		32-44-16	403	Nov 15/82	
32-44-00	107	Mar 15/81		32-44-16	404	Nov 15/82	
32-44-00	108	May 15/82		32-44-16	405	Nov 15/82	
32-44-00	109	Mar 15/81		32-44-16	406	Nov 15/82	
32-44-00	110	Mar 15/81		32-44-17	401	May 15/76	
32-44-00	111/112	Nov 15/81		32-44-17	402	May 15/76	
32-44-00	113/114	Nov 15/82		32-44-17	403/404	May 15/76	
32-44-00	115/116	Nov 15/82		32-45-00	1	Dec 1/71	
32-44-00	117/118	May 15/87		32-45-00	2	Dec 1/71	
32-44-00	501	Aug 15/82		32-45-00	3	Feb 15/77	
32-44-00	502	Aug 15/82		32-45-00	4	Dec 1/71	
R 32-44-00	503	Jun 15/96		32-45-00	101	Mar 15/81	
32-44-00	504	Aug 15/82		32-45-00	102	Mar 15/81	
R 32-44-00	505	Jun 15/96		32-45-00	103	Mar 15/81	
32-44-00	506	Aug 15/82		32-45-00	104	Mar 15/81	
32-44-01	401	Jun 15/94		32-45-00	105/106	Mar 15/81	
32-44-01	402	Feb 15/74		32-45-00	201/202	Jul 15/83	
32-44-01	403	Jun 15/94		32-45-00	501	May 15/73	
32-44-01	404	Nov 15/82		32-45-00	502	May 15/73	
32-44-02	401	Jun 15/94		32-45-01	401	Feb 15/76	
32-44-02	402	Jun 15/94		32-45-01	402	Feb 15/76	
32-44-02	403	Jun 15/94		32-45-02	401	Feb 15/76	
32-44-02	404	Mar 15/83		32-45-02	402	Feb 15/76	
32-44-03	401	Aug 15/76		32-45-02	403/404	Feb 15/76	
32-44-03	402	Jun 15/93		32-45-03	401	May 15/74	
32-44-03	403	Jun 15/93		32-45-03	402	May 15/74	
32-44-03	404	Aug 15/76		32-45-03	601	Aug 15/75	
32-44-04	401	Nov 15/89		32-45-03	602	Aug 15/75	
32-44-04	402	Nov 15/89		32-45-04	401	Apr 1/72	
32-44-04	403/404	Jul 15/83		32-45-04	402	Apr 1/72	
32-44-05	201/202	Aug 15/82		32-45-04	403/404	Apr 1/72	
32-44-05	401	Mar 15/80		32-46-00	1	Jan 15/73	
32-44-05	402	Dec 1/71		32-46-00	2	May 15/76	
32-44-06	401/402	Jan 15/73		32-46-00	101	Mar 15/81	



MAINTENANCE MANUAL

<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>	<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>
32-46-00	102	Mar 15/81		32-48-02	404	Nov 15/75	1
32-46-00	103	Mar 15/81		32-48-02	401	Mar 15/83	2
32-46-00	104	Mar 15/81		32-48-02	402	Nov 15/74	2
32-46-00	105	Mar 15/81		32-48-02	403	Nov 15/74	2
32-46-00	106	Mar 15/81		32-48-02	404	Mar 15/81	2
32-46-00	201/202	May 15/90		32-48-02	405/406	Mar 15/81	2
32-46-01	401	May 15/76		32-48-02	501	Sep 15/73	
32-46-01	402	Aug 15/81		32-48-02	502	Sep 15/73	
32-46-01	403/404	May 15/76		32-48-02	503/504	Sep 15/73	
32-46-02	401	Dec 1/72		32-48-03	401	Dec 15/80	1
32-46-02	402	Dec 1/72		32-48-03	402	Dec 15/80	1
32-46-02	403/404	Dec 15/80		32-48-03	403/404	Dec 15/80	1
32-46-03	401	Dec 1/72		32-48-03	401	Nov 15/88	2
32-46-03	402	Mar 15/80		32-48-03	402	Nov 15/87	2
32-46-03	403/404	Dec 15/80		32-48-03	403/404	May 15/85	2
32-46-05	401	Mar 15/91		32-48-03	405	Nov 15/88	2
32-46-05	402	Mar 15/91		32-48-03	406	Nov 15/88	2
32-46-05	403	Mar 15/91		32-48-04	401	Nov 15/81	
32-46-05	404	Mar 15/91		32-48-04	402	Aug 15/81	
32-48-00	1	Mar 15/83		32-48-04	403/404	Sep 15/73	
32-48-00	2	May 15/87		32-51-00	1	Mar 15/84	
32-48-00	3	May 15/87		32-51-00	2	Jul 15/84	
32-48-00	4	Aug 15/74		32-51-00	3	May 15/88	
32-48-00	5	Aug 15/74		32-51-00	4	May 15/88	
32-48-00	6	Aug 15/74		32-51-00	5/6	Mar 15/84	
32-48-00	7/8	Aug 15/82		32-51-00	7/8	Mar 15/84	
32-48-00	9/10	Nov 15/84		32-51-00	9	May 15/88	
32-48-00	11/12	Nov 15/84		32-51-00	10	May 15/88	
32-48-00	13/14	Aug 15/81		32-51-00	11	May 15/88	
32-48-00	101	Mar 15/81		32-51-00	12	May 15/88	
32-48-00	102	Aug 15/81		32-51-00	13	May 15/88	
32-48-00	103	Mar 15/81		32-51-00	14	May 15/88	
32-48-00	104	Mar 15/81		32-51-00	15/16	Mar 15/84	
32-48-00	105	Nov 15/88		32-51-00	101	Mar 15/81	
32-48-00	106	Nov 15/82		32-51-00	102	Nov 15/83	
32-48-00	107	Nov 15/82		32-51-00	103/104	Aug 15/81	
32-48-00	108	Nov 15/82		32-51-00	105/106	Jul 15/84	
32-48-00	109	Nov 15/82		32-51-00	107/108	Mar 15/84	
32-48-00	110	Nov 15/82		32-51-00	109	Jul 15/84	
32-48-00	111	Jul 15/84		32-51-00	110	Jul 15/84	
32-48-00	112	Nov 15/82		32-51-00	111	May 15/87	
32-48-00	113/114	Nov 15/82		32-51-00	112	Jul 15/84	
32-48-00	115/116	Nov 15/84		32-51-00	113	Jul 15/84	
32-48-00	117/118	Nov 15/84		32-51-00	114	Jul 15/84	
32-48-00	501/502	Sep 15/73		32-51-00	115	May 15/88	
32-48-02	401	Feb 15/76	1	32-51-00	116	May 15/88	
32-48-02	402	Nov 15/75	1	32-51-00	501	May 15/90	
32-48-02	403	Nov 15/81	1	32-51-00	502	May 15/90	

List of Effective Pages
Page 12
Jun 15/96



MAINTENANCE MANUAL

<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>	<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>
32-51-00	503	May 15/90		32-51-04	504	Jun 15/79	
32-51-00	504	Mar 15/84		32-51-04	505	Jul 15/84	
32-51-00	505	Jul 15/84		32-51-04	506	Nov 15/84	
32-51-00	506	Jul 15/84		32-51-04	507	May 15/82	
32-51-00	507/508	Mar 15/84		32-51-04	508	May 15/82	
32-51-00	509/510	Jul 15/84		32-51-04	509/510	May 15/82	
32-51-00	511	Mar 15/84		32-51-04	511/512	Aug 15/82	
32-51-00	512	Mar 15/84		32-51-04	513/514	Jul 15/84	
32-51-00	513	Mar 15/84		32-51-04	515/516	Jun 15/79	
32-51-00	514	Jul 15/84		32-51-05	401	Nov 15/77	
32-51-00	515	Mar 15/84		32-51-05	402	Nov 15/77	
R 32-51-00	516	Jun 15/96		32-51-05	403/404	Nov 15/77	
32-51-00	517/518	Mar 15/84		32-51-05	405/406	Nov 15/77	
32-51-00	701	May 15/77		32-51-05	801	Feb 15/75	
32-51-00	702	May 15/77		32-51-05	802	Aug 15/81	
32-51-02	401	Dec 15/93		32-51-05	803/804	Feb 15/75	
32-51-02	402	Nov 15/86		32-51-06	401	Nov 15/88	
32-51-02	403	Feb 15/74		32-51-06	402	Nov 15/88	
32-51-02	404	Dec 1/72		32-51-06	403/404	Nov 15/88	
32-51-02	405	Nov 15/86		32-51-06	405/406	Jul 15/73	
32-51-02	406	Nov 15/86		32-51-10	401	Dec 15/93	
32-51-03	201	Jul 15/84		32-51-10	402	Aug 15/81	
32-51-03	202	Aug 15/81		32-51-10	403/404	Aug 15/74	
32-51-03	203	Mar 15/81		32-51-10	405/406	Aug 15/74	
32-51-03	204	Mar 15/81		32-51-10	407	Aug 15/81	
32-51-03	205/206	Jul 15/84		32-51-10	408	Aug 15/81	
32-51-03	401	Mar 15/84		32-51-10	409	Mar 15/84	
32-51-03	402	Mar 15/84		32-51-10	410	Mar 15/84	
32-51-03	403	Mar 15/84		32-51-10	411/412	Mar 15/84	
32-51-03	404	Mar 15/84		32-51-11	401	Dec 15/93	
32-51-03	405	Jul 15/84		32-51-11	402	Nov 15/75	
32-51-03	406	Mar 15/84		32-51-11	403	Aug 15/74	
32-51-03	407	Mar 15/84		32-51-11	404	Aug 15/74	
32-51-03	408	Jul 15/84		32-51-11	405	Jun 15/79	
32-51-03	409	Mar 15/84		32-51-11	406	Jul 15/84	
32-51-03	410	Mar 15/84		32-51-11	407	Nov 15/82	
32-51-03	411/412	Mar 15/84		32-51-11	408	Mar 15/84	
32-51-04	401	Nov 15/75		32-51-11	409/410	Mar 15/84	
32-51-04	402	May 15/82		32-51-12	401	Mar 15/91	
32-51-04	403/404	May 15/82		32-51-12	402	Dec 15/91	
32-51-04	405/406	May 15/82		32-51-12	403/404	Dec 15/91	
32-51-04	407	May 15/82		32-51-13	401	Mar 15/84	
32-51-04	408	Mar 15/80		32-51-13	402	Mar 15/84	
32-51-04	409	Nov 15/82		32-51-13	403/404	Mar 15/84	
32-51-04	410	May 15/82		32-51-15	401	Mar 15/84	
32-51-04	501	Dec 15/79		32-51-15	402	Jul 15/84	
32-51-04	502	Jul 15/84		32-51-15	403	Mar 15/84	
32-51-04	503	Jul 15/84		32-51-15	404	Mar 15/84	



MAINTENANCE MANUAL

<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>	<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>
32-51-15	405	Mar 15/84		32-61-00	118	Nov 15/83	
32-51-15	406	Jul 15/84		32-61-00	119	Aug 15/81	
32-51-15	501	Mar 15/84		32-61-00	120	Aug 15/81	
32-51-15	502	Mar 15/84		32-61-00	121/122	Aug 15/82	
32-51-15	503	Jul 15/84		32-61-00	123/124	Aug 15/82	
32-51-15	504	Jul 15/84		32-61-00	125/126	May 15/88	
32-51-15	505	Mar 15/84		32-61-00	127/128	May 15/88	
32-51-15	506	Jul 15/84		32-61-00	129/130	Mar 15/81	
32-51-16	501	Mar 15/84		32-61-00	131/132	Jun 15/95	
32-51-16	502	Mar 15/84		32-61-00	133/134	May 15/88	
32-51-16	503/504	Mar 15/84		32-61-00	135/136	Dec 15/93	
32-51-18	401	Jun 15/79		32-61-00	201	May 15/85	
32-51-18	402	Mar 15/84		32-61-00	202	May 15/85	
32-51-18	403	Mar 15/84		32-61-00	203	May 15/85	
32-51-18	404	Mar 15/84		32-61-00	204	May 15/85	
32-61-00	1	Aug 15/81		32-61-00	205	May 15/85	
32-61-00	2	May 15/82		32-61-00	206	May 15/85	
32-61-00	3/4	Aug 15/81		32-61-00	207/208	May 15/85	
32-61-00	5	Aug 15/82		32-61-00	501	May 15/86	
32-61-00	6	Nov 15/86		32-61-00	502	May 15/86	
32-61-00	7/8	Aug 15/82		32-61-00	503	May 15/86	
32-61-00	9/10	Aug 15/82		32-61-00	504	May 15/86	
32-61-00	11/12	May 15/88		32-61-00	505	Feb 15/79	
32-61-00	13/14	May 15/88		32-61-00	506	Feb 15/79	
32-61-00	15/16	Aug 15/75		32-61-00	507	Feb 15/79	
32-61-00	17/18	Jun 15/95		32-61-00	508	Feb 15/79	
32-61-00	19/20	Nov 15/86		32-61-00	509	Feb 15/79	
32-61-00	21	Dec 15/93		32-61-00	510	May 15/86	
32-61-00	22	Aug 15/77		32-61-00	511	May 15/86	
32-61-00	23	Aug 15/82		32-61-00	512	May 15/86	
32-61-00	24	Aug 15/82		32-61-00	513	May 15/86	
32-61-00	101	Nov 15/82		32-61-00	514	May 15/86	
32-61-00	102	Jun 15/95		32-61-00	515	May 15/82	
32-61-00	103	Mar 15/81		32-61-00	516	Feb 15/79	
32-61-00	104	Mar 15/81		32-61-00	517	Feb 15/79	
32-61-00	105	Mar 15/81		32-61-00	518	May 15/82	
32-61-00	106	Mar 15/81		32-61-00	519/520	Aug 15/81	
32-61-00	107	Aug 15/81		32-61-02	401	May 15/87	
32-61-00	108	Aug 15/81		32-61-02	402	Aug 15/74	
32-61-00	109	Aug 15/81		32-61-02	403/404	May 15/85	
32-61-00	110	Aug 15/81		32-61-02	501	May 15/85	
32-61-00	111	Aug 15/81		32-61-02	502	May 15/85	
32-61-00	112	Aug 15/81		32-61-02	503/504	May 15/85	
32-61-00	113	Aug 15/81		32-61-03	401	May 15/87	
32-61-00	114	Aug 15/81		32-61-03	402	Feb 15/74	
32-61-00	115	Aug 15/81		32-61-03	403/404	May 15/73	
32-61-00	116	Jul 15/83		32-61-03	501	Jun 15/92	
32-61-00	117	Aug 15/81		32-61-03	502	Jun 15/92	

List of Effective Pages
Page 14
Jun 15/96



MAINTENANCE MANUAL

<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>	<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>
32-61-04	401	May 15/87		32-61-09	703	Nov 15/89	
32-61-04	402	May 15/73		32-61-09	704	Nov 15/88	
32-61-04	403/404	Mar 15/80		32-61-09	705	Nov 15/88	
32-61-04	501	Aug 15/82		32-61-09	706	Nov 15/88	
32-61-04	502	Aug 15/82		32-61-09	707/708	Nov 15/89	
32-61-04	503	Aug 15/82		32-61-12	401	May 15/87	
32-61-04	504	Aug 15/82		32-61-12	402	Aug 15/81	
32-61-04	505/506	Aug 15/82		32-61-12	403/404	Mar 15/80	
32-61-05	401	May 15/87		32-61-12	405/406	Sep 15/73	
32-61-05	402	Sep 15/79		32-63-00	1	Jul 15/84	
32-61-05	403/404	May 15/73		32-63-00	2	Nov 15/76	
32-61-05	501	Jul 15/83		32-63-00	3/4	Jul 15/84	
32-61-05	502	May 15/82		32-63-00	5/6	Jul 15/84	
32-61-06	401	May 15/87		32-63-00	101	Jul 15/84	
32-61-06	402	May 15/87		32-63-00	102	Aug 15/82	
32-61-06	403/404	Feb 15/74		32-63-00	103	Aug 15/82	
32-61-06	501	May 15/82		32-63-00	104	Aug 15/82	
32-61-06	502	Aug 15/81		32-63-00	105	Aug 15/82	
32-61-06	503/504	May 15/82		32-63-00	106	Jul 15/84	
32-61-07	401	May 15/87		32-63-00	107	Aug 15/82	
32-61-07	402	Aug 15/82		32-63-00	108	Nov 15/84	
32-61-07	403/404	Jun 15/95		32-63-00	109/110	Nov 15/84	
32-61-07	405/406	Jun 15/95		32-63-00	111/112	Mar 15/91	
32-61-07	407/408	Jun 15/95		32-63-00	113/114	Nov 15/84	
32-61-07	501	Nov 15/84		32-63-00	201	Nov 15/81	
32-61-07	502	Nov 15/84		32-63-00	202	Nov 15/81	
32-61-07	503	May 15/86		32-63-00	501	May 15/86	
32-61-07	504	Nov 15/84		32-63-00	502	May 15/86	
32-61-08	401	Feb 15/74		32-63-00	503	May 15/86	
32-61-08	402	Dec 15/80		32-63-00	504	May 15/86	
32-61-08	403	Dec 15/80		32-63-01	401	Nov 15/76	
32-61-08	404	Dec 15/80		32-63-01	402	Nov 15/76	
32-61-08	501	Nov 15/82		32-63-01	403/404	Nov 15/76	
32-61-08	502	Nov 15/88		32-63-02	401	Nov 15/76	
32-61-08	503	Nov 15/88		32-63-02	402	Nov 15/76	
32-61-08	504	Nov 15/88		32-63-02	403/404	Nov 15/76	
32-61-08	505/506	Nov 15/82		32-71-00	1	Aug 15/82	
32-61-08	507/508	Nov 15/82		32-71-00	2	Dec 1/71	
32-61-09	201	May 15/75		32-71-00	3	May 15/85	
32-61-09	202	Mar 15/80		32-71-00	4	Dec 15/93	
32-61-09	401	Aug 15/76		32-71-00	5/6	Dec 15/79	
32-61-09	402	Aug 15/76		32-71-00	7	May 15/85	
32-61-09	403/404	Aug 15/76		32-71-00	8	May 15/85	
32-61-09	501	May 15/82		32-71-00	9/10	Dec 15/79	
32-61-09	502	May 15/82		32-71-00	11/12	Dec 15/79	
32-61-09	503/504	Aug 15/76		32-71-00	101	Mar 15/81	
32-61-09	701	Nov 15/88		32-71-00	102	Mar 15/81	
32-61-09	702	Mar 15/91		32-71-00	103/104	Mar 15/81	

LOCKHEED



MAINTENANCE MANUAL

<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>	<u>CHAPTER/ SECTION</u>	<u>PAGE</u>	<u>DATE</u>	<u>CONFIG CODE</u>
32-71-00	105/106	Mar 15/81					
32-71-00	107/108	Mar 15/81					
32-71-00	109	Nov 15/87					
32-71-00	110	Mar 15/81					
32-71-00	111	Mar 15/81					
32-71-00	112	Dec 15/93					
32-71-00	201	Nov 15/84					
32-71-00	202	Nov 15/84					
32-71-00	203	Nov 15/84					
32-71-00	204	Nov 15/84					
32-71-00	205/206	Oct 1/72					
32-71-00	601	Dec 15/91					
32-71-00	602	Mar 15/91					
32-71-00	603	Mar 15/91					
32-71-00	604	Mar 15/91					
32-71-00	605/606	Mar 15/91					
32-71-01	401	Nov 15/84					
32-71-01	402	Nov 15/84					
32-71-01	403	Nov 15/81					
32-71-01	404	Nov 15/84					
32-71-01	405	Mar 15/81					
32-71-01	406	Mar 15/81					
32-71-01	407	Nov 15/84					
32-71-01	408	Nov 15/84					
32-71-01	409/410	May 15/85					
32-71-02	401	Nov 15/84					
32-71-02	402	Nov 15/84					
32-71-02	403	Nov 15/84					
32-71-02	404	Jun 15/80					
32-71-05	401	Nov 15/84					
32-71-05	402	Nov 15/84					
32-71-05	403	Nov 15/84					
32-71-05	404	Nov 15/77					
32-71-08	401	Mar 15/80					
32-71-08	402	Sep 15/80					
32-71-10	401/402	Aug 15/74					

List of Effective Pages
Page 16
Jun 15/96

LOCKHEED
MAINTENANCE MANUAL

CHAPTER 32

LANDING GEAR

TABLE OF CONTENTS

Subject		Chapter Section Subject	Page	Effec- tivity
C	<u>WORK SHEETS</u>	32-WKSH		
C	Maintenance Work Sheet		1	ALL
	<u>LANDING GEAR</u>	32-00-00		
	Description and Operation		1	ALL
	Maintenance Practices		201	ALL
	<u>MAIN LANDING GEAR AND DOORS</u>	32-10-00		
	Description and Operation		1	ALL
	Fault Isolation		101	ALL
	Maintenance Practices		201	ALL
	<u>MAIN LANDING GEAR SYSTEM</u>	32-11-00		
	Description and Operation		1	ALL
	Adjustment/Test		501	ALL
	<u>MAIN LANDING GEAR ASSEMBLY</u>	32-11-01		
	Removal/Installation		401	ALL



Subject	Chapter Section Subject	Page	Effec- tivity
<u>MAIN LANDING GEAR AND DOORS (CONT)</u>	32-10-00		
SHOCK STRUT - MLG	32-11-02		
Removal/Installation		401	ALL
Inspection/Check		601	ALL
Approved Repairs		801	ALL
TRUCK - MLG	32-11-03		
Removal/Installation		401	ALL
AXLE - MLG	32-11-04		
Removal/Installation		401	ALL
Inspection/Check		601	ALL
SNUBBER - MLG UPLOCK	32-11-06		
Removal/Installation		401	ALL
Inspection/Check		601	ALL
TORQUE LINK ASSEMBLY - MAIN LANDING GEAR BRAKE	32-11-07		
Removal/Installation		401	ALL
TORQUE ARMS - MLG UPPER AND LOWER	32-11-08		
Removal/Installation		401	ALL
Inspection/Check		601	ALL
SNUBBER - MLG UPSTOP	32-11-10		
Removal/Installation		401	ALL
Inspection/Check		601	ALL
BRACE - SIDE, MLG UPPER	32-11-11		
Removal/Installation		401	ALL
BRACE - SIDE, MLG LOWER	32-11-12		
Removal/Installation		401	ALL
BRACE - LATERAL, MLG	32-11-13		
Removal/Installation		401	ALL

LOCKHEED
MAINTENANCE MANUAL

Subject		Chapter Section Subject	Page	Effec- tivity
MAIN LANDING GEAR AND DOORS (CONT)		32-10-00		
	BRACE - JURY, MLG	32-11-14		
	Removal/Installation		401	ALL
	TRUNNION PINS - MAIN LANDING GEAR, FORWARD AND AFT	32-11-17		
	Inspection/Check		601	ALL
	SHIELD - TRUCK BEAM	32-11-19		
R	Removal/Installation		401	ALL
	SPRINGS - DOWNLOCK, MAIN LANDING GEAR	32-11-20		
	Removal/Installation		401	ALL
	HOSE ASSEMBLIES - HYDRAULIC, MAIN LANDING GEAR	32-11-26		
	Removal/Installation		401	ALL
	ACTUATOR ATTACH PIN ASSEMBLY - MLG	32-11-27		
R	Removal/Installation		401	ALL
	DOOR - MLG INBOARD	32-12-01		
	Removal/Installation		401	ALL
	Adjustment/Test		501	ALL

32-CONTENTS

Page 3
May 15/85

LOCKHEED
MAINTENANCE MANUAL

Subject	Chapter Section Subject	Page	Effec- tivity
<u>MAIN LANDING GEAR AND DOORS (CONT)</u>	32-10-00		
DOOR - MLG FIXED Removal/Installation	32-12-02	401	CONFIG 1 001-031 WITHOUT SB52-074
Removal/Installation		401	CONFIG 2 001-031 WITH SB52-074 AND 032-999
Adjustment/Test		501	CONFIG 1 001-031 WITHOUT SB52-074
Adjustment/Test		501	CONFIG 2 001-031 WITH SB52-074 AND 032-999
Inspection/Check		601	CONFIG 1 001-031 WITHOUT SB52-074
Inspection/Check		601	CONFIG 2 001-032 WITH SB52-074 AND 032-999
R DOOR - MLG HINGED Removal/Installation	32-12-03	401	CONFIG 1 001-014 WITHOUT SB52-046
Removal/Installation		401	CONFIG 2 001-014 WITH SB52-046 AND 015-999

32-CONTENTS

Page 4
Nov 15/89

LOCKHEED



MAINTENANCE MANUAL

Subject	Chapter Section Subject	Page	Effec- tivity
<u>MAIN LANDING GEAR AND DOORS (CONT)</u>	32-10-00		
DOOR - MLG HINGED (CONT)	32-12-03		
Adjustment/Test		501	CONFIG 1 001-014 WITHOUT SB52-046
Adjustment/Test		501	CONFIG 2 001-014 WITH SB52-046 AND 015-999 ALL
Inspection/Check		601	ALL
DOOR ROD - MLG INBOARD	32-12-05		
Removal/Installation		401	ALL
DOOR LINK ASSEMBLY - MAIN LANDING			
GEAR INBOARD	32-12-07		
Removal/Installation		401	ALL
DOOR - MLG INBOARD, MANUAL OPENING SYSTEM	32-13-00		
Adjustment/Test		501	ALL



Subject	Chapter Section Subject	Page	Effec- tivity
<u>NOSE LANDING GEAR AND DOORS</u>	32-20-00		
Description and Operation		1	ALL
Fault Isolation		101	ALL
NOSE LANDING GEAR SYSTEM	32-21-00		
Description and Operation		1	ALL
GEAR ASSEMBLY - NLG	32-21-01		
Removal/Installation		401	ALL
SHOCK STRUT - NLG	32-21-02		
Removal/Installation		401	ALL
Approved Repairs		801	ALL
DRAG BRACE - NLG UPPER	32-21-03		
Removal/Installation		401	ALL
DRAG BRACE - NLG LOWER	32-21-04		
Removal/Installation		401	ALL
TORQUE ARMS - NLG UPPER AND LOWER	32-21-05		
Removal/Installation		401	ALL
SHIELD - NLG AXLE	32-21-09		
Removal/Installation		401	ALL
SPRINGS - NLG JURY BRACE	32-21-10		
Removal/Installation		401	ALL
TRUNNION BEARINGS - NLG UPPER DRAG BRACE	32-21-11		
Removal/Installation		401	ALL
TRUNNION BEARING - NLG SHOCK STRUT	32-21-12		
Removal/Installation		401	ALL
BRAKE ASSEMBLY - SPIN, NOSE WHEEL	32-21-15		
Removal/Installation		401	ALL
AXLE SLEEVE - NLG	32-21-16		
Removal/Installation		401	ALL

LOCKHEED



MAINTENANCE MANUAL

Subject	Chapter Section Subject	Page	Effec- tivity
<u>NOSE LANDING GEAR AND DOORS (CONT)</u>	32-20-00		
DOOR - NLG FORWARD Removal/Installation Adjustment/Test	32-22-01	401 501	ALL ALL
R			
DOOR - NLG AFT Removal/Installation Adjustment/Test	32-22-02	401 501	ALL ALL



MAINTENANCE MANUAL

Subject	Chapter Section Subject	Page	Effec- tivity
<u>EXTENSION AND RETRACTION</u>	32-30-00		
Description and Operation		1	ALL
Fault Isolation/Identification		101	ALL
Maintenance Practices		201	ALL
Adjustment/Test		501	ALL
LANDING GEAR CONTROL SYSTEM	32-31-00		
Description and Operation		1	ALL
MODULE - LANDING GEAR CONTROL	32-31-01		
Removal/Installation		401	ALL
VALVE - CARTRIDGE, FOUR WAY, THREE-POSITION SOLENOID	32-31-02		
Maintenance Practices		201	ALL
Removal/Installation		401	ALL
Adjustment/Test		501	ALL
VALVE - CARTRIDGE, HYDRUALIC FLOW REGULATOR (23 GPM)	32-31-04		
Removal/Installation		401	ALL
VALVE - CARTRIDGE, TWO-WAY HYDRAULIC FLOW REGULATOR (6 GPM)	32-31-05		
Removal/Installation		401	ALL
VALVE - CARTRIDGE, MANUALLY OPERATED BYPASS SELECTOR	32-31-06		
Removal/Installation		401	ALL

R



MAINTENANCE MANUAL

Subject		Chapter Section Subject	Page	Effec- tivity
<u>EXTENSION AND RETRACTION (CONT)</u>		32-30-00		
C	PLUG, VALVE - MANUAL SHUTOFF Removal/Installation		401	ALL
	VALVE - SHUTTLE, MAIN LANDING GEAR DOWNLOCK	32-31-10		
	Removal/Installation		401	ALL
	VALVE - CHECK, VACUUM CONTROLLED Removal/Installation	32-31-11	401	ALL
	SWITCH - LANDING GEAR CONTROL Maintenance Practices	32-31-14	201	ALL
	Removal/Installation		401	ALL
	SWITCH - HYDRAULIC PRESSURE Removal/Installation	32-31-15	401	ALL
	HYDRAULIC FUSE - MAIN LANDING GEAR Maintenance Practices	32-31-16	201	ALL
CR	Trouble Shooting - Hydraulic Fuse Set		203	ALL
	Removal/Installation		401	ALL
	CARTRIDGE VALVE - PRESSURE REGULATOR Removal/Installation	32-31-18	401	ALL
	LANDING GEAR CONTROL SWITCH Maintenance Practices	32-31-41	201	ALL

LOCKHEED



MAINTENANCE MANUAL

Subject	Chapter Section Subject	Page	Effec- tivity
<u>EXTENSION AND RETRACTION (CONT)</u>	32-30-00		
MAIN LANDING GEAR EXTENSION AND RETRACTION	32-32-00		
Description and Operation		1	ALL
Maintenance Practices		201	ALL
ACTUATOR - MAIN LANDING GEAR RETRACT	32-32-01		
Removal/Installation		401	ALL
ACTUATOR - MAIN LANDING GEAR JURY BRACE	32-32-02		
Removal/Installation		401	ALL
POSITIONER - TRUCK	32-32-03		
Removal/Installation		401	ALL
Inspection/Check		601	ALL
RELIEF VALVE - HYDRAULIC RETRACTION	32-32-04		
Removal/Installation		401	ALL



Subject	Chapter Section Subject	Page	Effect- tivity
<u>EXTENSION AND RETRACTION (CONT)</u>	32-30-00		
MAIN LANDING GEAR DOOR ACTUATION	32-33-00		
Description and Operation		1	ALL
INBOARD DOOR - MAIN LANDING GEAR	32-33-00		
Maintenance Practices		201	ALL
ACTUATOR - INBOARD DOOR, MLG	32-33-01		
Removal/Installation		401	ALL
VALVE - GROUND CONTROL, INBOARD			
DOOR, MLG	32-33-02		
Removal/Installation		401	ALL
VALVE - CHECK, PRESSURE CONTROLLED	32-33-04		
Removal/Installation		401	ALL
VALVE - MLG RUN-AROUND	32-33-05		
Removal/Installation		401	ALL
VALVE MODULE - MLG PHASE CONTROL	32-33-06		
Removal/Installation		401	ALL
MLG INBOARD DOOR LOCK ACTUATOR	32-33-08		
Removal/Installation		401	ALL
VALVE - CARTRIDGE, DIFFERENTIAL	32-33-09		
PRIORITY			
Removal/Installation		401	ALL
NOSE LANDING GEAR EXTENSION AND			
RETRACTION	32-34-00		
Description and Operation		1	ALL
ACTUATOR - RETRACT, NOSE			
LANDING GEAR	32-34-01		
Removal/Installation		401	ALL
VALVE, ACTUATOR RELIEF - NOSE			
LANDING GEAR	32-34-02		
Removal/Installation		401	ALL
VALVE, ACTUATOR SHUTTLE OR			
RESTRICTOR - NOSE LANDING GEAR	32-34-03		
Removal/Installation		401	ALL

R
R
R

LOCKHEED



MAINTENANCE MANUAL

Subject	Chapter Section Subject	Page	Effec- tivity
<u>EXTENSION AND RETRACTION (CONT)</u>	32-30-00		
ACTUATOR -- UPLOCK, NLG Removal/Installation	32-34-04	401	ALL
UPLOCK ASSEMBLY - NOSE LANDING GEAR Removal/Installation	32-34-05	401	ALL
CRANK ASSEMBLY - JURY BRACE ACTUATOR, NOSE LANDING GEAR Removal/Installation	32-34-06	401	ALL

LOCKHEED
MAINTENANCE MANUAL

Subject	Chapter Section Subject	Page	Effec- tivity
<u>EXTENSION AND RETRACTION (CONT)</u>	32-30-00		
NOSE LANDING GEAR DOOR ACTUATION Description and Operation	32-35-00	1	ALL
ROD ASSEMBLY - NLG FORWARD DOOR Removal/Installation	32-35-01	401	ALL
LANDING GEAR HYDRAULIC ALTERNATE EXTENSION SYSTEM	32-36-00		
Description and Operation		1	ALL
Fault Isolation/Identification		101	ALL
Maintenance Practices		201	ALL
VALVE - HYDRAULIC EXTENSION, LANDING GEAR ALTERNATE Removal/Installation	32-36-01	401	ALL
LANDING GEAR MECHANICAL ALTERNATE EXTENSION SYSTEM	32-37-00		
Description and Operation		1	ALL
Fault Isolation		101	ALL
Maintenance Practices		201	ALL
Adjustment/Test		501	ALL

LOCKHEED



MAINTENANCE MANUAL

Subject		Chapter Section Subject	Page	Effec- tivity
<u>WHEELS AND BRAKES</u>		32-40-00		
	MAIN LANDING GEAR WHEELS AND TIRES Description and Operation	32-41-00	1	ALL
	WHEEL AND TIRE ASSEMBLY - MAIN LANDING GEAR	32-41-01		
	Removal/Installation		401	ALL
C	Inspection/Check		601	ALL
	NOSE LANDING GEAR WHEELS AND TIRES Description and Operation	32-42-00	1	ALL
R				
	WHEEL AND TIRE ASSEMBLY - NOSE LANDING GEAR	32-42-01		
	Removal/Installation		401	ALL



Subject	Chapter Section Subject	Page	Effect- tivity
<u>WHEELS AND BRAKES (CONT)</u>	32-40-00		
MAIN LANDING GEAR BRAKE SYSTEM	32-43-00		
Description and Operation		1	ALL
Fault Isolation		101	ALL
Maintenance Practices		201	ALL
Adjustment/Test		501	CONFIG 1 001-014
Adjustment/Test		501	CONFIG 2 015-999
Inspection/Check		601	ALL
R BRAKE - MLG	32-43-01		
Maintenance Practices		201	ALL
Removal/Installation		401	ALL
BRAKE ZERO LEAK DISCONNECT	32-43-02		
Removal/Installation		401	ALL
VALVE - BRAKE SHUTTLE	32-43-03		
Removal/Installation		401	ALL
VALVE - DUAL POWER BRAKE	32-43-04		
Removal/Installation		401	ALL
MODULE - BRAKE SUPPLY	32-43-06		
Removal/Installation		401	ALL
MODULE CARTRIDGE - BRAKE SUPPLY	32-43-07		
Removal/Installation		401	ALL
Inspection/Check		601	ALL



Subject	Chapter Section Subject	Page	Effec- tivity
<u>WHEELS AND BRAKES (CONT)</u>	32-40-00		
ACCUMULATOR - BRAKE, 200 CUBIC INCH Removal/Installation	32-43-09	401	ALL
ACCUMULATOR - BRAKE, 707 CUBIC INCH Removal/Installation	32-43-11	401	ALL
VALVE - PRESSURE ACTUATED HYDRAULIC (SPINDOWN) Removal/Installation	32-43-14	401	ALL
INPUT ROD AND INPUT MECHANISM - BRAKE Removal/Installation	32-43-18	401	ALL
VALVE - CHECK, BRAKE RETURN LINE Removal/Installation	32-43-21	401	ALL
SPRING - BRAKE RETURN Removal/Installation	32-43-22	401	ALL
ROD - BRAKE INPUT Removal/Installation	32-43-23	401	ALL

LOCKHEED



MAINTENANCE MANUAL

Subject		Chapter Section Subject	Page	Effect- tivity
<u>WHEELS AND BRAKES (CONT)</u>		32-40-00		
R	ANTISKID CONTROL SYSTEM	32-44-00		
R	Description and Operation		1	ALL
R	Fault Isolation/Identification		101	ALL
R	Adjustment/Test		501	ALL



Subject	Chapter Section Subject	Page	Effec- tivity
<u>WHEELS AND BRAKES (CONT)</u>	32-40-00		
MODULE - BRAKE CONTROL	32-44-01		
Removal/Installation		401	ALL
VALVE - ANTISKID CONTROL	32-44-02		
Removal/Installation		401	ALL
VALVE - RETURN SHUTOFF, PARKING BRAKE	32-44-03		
Removal/Installation		401	ALL
SENSOR AND HUB (DRIVE) CAP ASSEMBLY - ANTISKID WHEEL SPEED	32-44-04		
Removal/Installation		401	ALL
MONITOR - FLIGHT STATION ANTISKID CONTROL	32-44-05		
Maintenance Practices		201	ALL
CONTROL UNIT (ECU) - SYSTEM ELECTRONIC	32-44-06		
Removal/Installation		401	ALL
WIRING BOARD (ECU) - PRINTED	32-44-07		
Removal/Installation		401	ALL
INDICATOR - BRAKE FILTER DIFFERENTIAL PRESSURE	32-44-13		
Removal/Installation		401	ALL
FILTERS - BRAKE CONTROL MODULE	32-44-14		
Removal/Installation		401	ALL
FUSE - HYDRAULIC BRAKE	32-44-16		
Maintenance Practices		201	ALL
Removal/Installation		401	ALL
SELECTOR SWITCH - BRAKE SYSTEM	32-44-17		
Removal/Installation		401	ALL



Subject		Chapter Section Subject	Page	Effec- tivity
<u>WHEELS AND BRAKES (CONT)</u>		32-40-00		
C C R	BRAKE TEMPERATURE INDICATION SYSTEM	32-45-00		
	Description and Operation		1	ALL
	Fault Isolation		101	ALL
	BRAKE TEMPERATURE INDICATING SYSTEM	32-45-00		
	Maintenance Practices		201	ALL
	Adjustment/Test		501	ALL
	MONITOR - BRAKE TEMPERATURE	32-45-01		
	Removal/Installation		401	ALL
	COMPENSATOR - BRAKE TEMPERATURE	32-45-02		
	Removal/Installation		401	ALL
	THERMOCOUPLE - BRAKE TEMPERATURE	32-45-03		
	Removal/Installation		401	ALL
	Inspection/Check		601	ALL
	PRINTED WIRING BOARD - BRAKE			
	TEMPERATURE MONITOR	32-45-04		
	Removal/Installation		401	ALL

LOCKHEED
MAINTENANCE MANUAL

Subject	Chapter Section Subject	Page	Effec- tivity
WHEELS AND BRAKES (CONT)	32-40-00		
BRAKE PRESSURE INDICATING SYSTEM	32-46-00		
Description and Operation		1	ALL
Maintenance Practices		201	ALL
Fault Isolation		101	ALL
PRESSURE INDICATOR - DUAL BRAKE SYSTEM	32-46-01		
Removal/Installation		401	ALL
SWITCH - HYDRAULIC (BRAKE) PRESSURE	32-46-02		
Removal/Installation		401	ALL
TRANSMITTER - BRAKE PRESSURE	32-46-03		
Removal/Installation		401	ALL
R R R TRANSDUCER - AIDS APPLIED BRAKE PRESSURE	32-46-05		
Removal/Installation		401	ALL
PARKING BRAKE SYSTEM	32-48-00		
Description and Operation		1	ALL
Fault Isolation		101	ALL
Adjustment/Test		501	ALL
SWITCH - MECHANICAL, PARKING BRAKE	32-48-02		
Removal/Installation		401	CONFIG 1 001-014
Removal/Installation		401	CONFIG 2 015-999
Adjustment/Test		501	015-999
CABLE ASSEMBLY - PARKING BRAKE	32-48-03		
Removal/Installation		401	CONFIG 1 001-014
Removal/Installation		401	CONFIG 2 015-999
SWITCH - HYDRAULIC, PARKING BRAKE	32-48-04		
Removal/Installation		401	ALL

LOCKHEED



MAINTENANCE MANUAL

Subject	Chapter Section Subject	Page	Effec- tivity
<u>STEERING SYSTEM</u>	32-50-00		
NOSE GEAR STEERING SYSTEM	32-51-00		
Description and Operation		1	ALL
Fault Isolation		101	ALL
Adjustment/Test		501	ALL
Cleaning/Painting		701	ALL
ACTUATOR - NOSE LANDING GEAR STEERING	32-51-02	401	ALL
ACTUATOR - RUDDER PEDAL DISCONNECT, NOSE LANDING GEAR	32-51-03		
Maintenance Practices		201	ALL
Removal/Installation		401	ALL

32-CONTENTS

Page 21

Dec 15/93

R
R
0508

LOCKHEED



MAINTENANCE MANUAL

Subject	Chapter Section Subject	Page	Effec- tivity
<u>STEERING SYSTEM (CONT)</u>	32-50-00		
STEERING MECHANISM - RUDDER PEDAL	32-51-04		
Removal/Installation		401	ALL
Adjustment/Test		501	ALL
VALVE - TRUNNION, STEERING,			
NOSE LANDING GEAR	32-51-05		
Removal/Installation		401	ALL
Approved Repairs		801	ALL



Subject	Chapter Section Subject	Page	Effec- tivity
<u>STEERING SYSTEM (CONT)</u>	32-50-00		
VALVE ASSEMBLY - STEERING, NOSE LANDING GEAR Removal/Installation	32-51-06	401	ALL
STEERING COLLAR - NOSE LANDING GEAR Removal/Installation	32-51-10	401	ALL
STEERING PLATE - NOSE LANDING GEAR Removal/Installation	32-51-11	401	ALL
NOSE STEERING CABLE DRUM ASSEMBLY Removal/Installation	32-51-12	401	ALL
SENSOR - FORCE, NOSE GEAR STEERING Removal/Installation	32-51-13	401	ALL
DISPLACEMENT SWITCH - CABLE DRUM, NOSE GEAR STEERING Removal/Installation	32-51-15	401 501	ALL ALL
Adjustment/Test			
SENSOR SWITCH - FORCE, NOSE GEAR STEERING Adjustment/Test	32-51-16	501	ALL
CABLE DRUM - RUDDER PEDAL STEERING INTERCONNECT MECHANISM Removal/Installation	32-51-18	401	ALL

R
R



Subject	Chapter Section Subject	Page	Effec- tivity
<u>POSITION AND WARNING SYSTEM</u>	32-60-00		
LANDING GEAR POSITION INDICATING AND WARNING SYSTEMS	32-61-00		
Description and Operation		1	ALL
Fault Isolation		101	ALL
Maintenance Practices		201	ALL
Adjustment/Test		501	ALL
R SENSOR - UP POSITION, MAIN LANDING GEAR	32-61-02		
Removal/Installation		401	ALL
Adjustment/Test		501	ALL
 SENSOR - DOWNLOCK, MAIN LANDING GEAR	32-61-03		
Removal/Installation		401	ALL
Adjustment/Test		501	ALL
 SENSOR - UPLOCK, NOSE LANDING GEAR	32-61-04		
Removal/Installation		401	ALL
Adjustment/Test		501	ALL
 SENSOR - DOWNLOCK NOSE LANDING GEAR	32-61-05		
Removal/Installation		401	ALL
Adjustment/Test		501	ALL
 SENSOR - UP POSITION, NOSE LANDING GEAR DOOR	32-61-06		
Removal/Installation		401	ALL
Adjustment/Test		501	ALL

LOCKHEED
MAINTENANCE MANUAL

Subject	Chapter Section Subject	Page	Effec- tivity
<u>POSITION AND WARNING SYSTEM (CONT)</u>	32-60-00		
SENSOR - INBOARD DOOR UPLOCK, MAIN LANDING GEAR	32-61-07		
Removal/Installation Adjustment/Test		401 501	ALL ALL
SENSOR - UNLEVEL POSITION, MAIN LANDING GEAR TRUCK	32-61-08		
Removal/Installation Adjustment/Test		401 501	ALL ALL
INDICATOR - MECHANICAL DOWNLOCK, MAIN LANDING GEAR	32-61-09		
Maintenance Practices		201	ALL
Removal/Installation		401	ALL
Adjustment/Test		501	ALL
Cleaning/Painting		701	ALL
SENSOR - POSITION INDICATING, TAIL SKID	32-61-12		
Removal/Installation		401	ALL
AIR/GROUND SENSING SYSTEM	32-63-00		
Description and Operation		1	ALL
Fault Isolation/Identification		101	ALL
Maintenance Practices		201	ALL
Adjustment/Test		501	ALL
SAFETY SENSOR - AIR GROUND, MLG Removal/Installation	32-63-01	401	ALL
SAFETY SENSOR - AIR/GROUND, NLG Removal/Installation	32-63-02	401	ALL



Subject	Chapter Section Subject	Page	Effec- tivity
<u>SUPPLEMENTARY GEAR</u>	32-70-00		
R TAIL SKID CONTROL SYSTEM	32-71-00		
Description and Operation		1	ALL
Fault Isolation		101	ALL
R Maintenance Practices		201	ALL
Inspection/Check		601	ALL
TAIL SKID - RETRACTABLE	32-71-01		
Removal/Installation		401	ALL
VALVE - SELECTOR CONTROL, TAIL SKID	32-71-02		
Removal/Installation		401	ALL
VALVE - RELIEF, UNLOCK, UPLOCK, TAIL SKID	32-71-05		
Removal/Installation		401	ALL
SHOE - TAIL SKID	32-71-08		
Removal/Installation		401	ALL
VALVE FILTER - RELIEF, UNLOCK, UPLOCK, TAIL SKID	32-71-10		
Removal/Installation		401	001-018 WITH SB32-070 AND 019-999

CHAPTER 32-LANDING GEARTABLE OF CONTENTS

<u>Subject</u>	<u>Chapter/ Section Subject</u>	<u>Page</u>
<u>FAULT CODE DIAGRAMS</u>		1
<u>FAULT CODE INDEX</u>		1
<u>MAIN LANDING GEAR AND DOORS</u>	32-10-00	
General		101
Fault Isolation		101
Component Location Index		102
Main Landing Gear Doors Locator Diagram		103
Main Landing Gear Doors Security Check		104
<u>NOSE LANDING GEAR AND DOORS</u>	32-20-00	
General		101
Fault Isolation		101
Component Location Index		102
Nose Landing Gear Doors Locator Diagram		103
Nose Landing Gear Doors Security Check		104
<u>EXTENSION AND RETRACTION</u>	32-30-00	
General		101
Supplemental Data		101
Fault Isolation		101
Landing Gear Hydraulic Diagram		103/104
R Component Location Index		109
Extension and Retraction Component Locator		110
Landing Gear Does Not Retract		118
LANDING GEAR Control Lever Cannot Be Raised		120
Landing Gear Does Not Extend Normally		121
Landing Gear Retraction/Extension Rate		
Abnormal		123/124
Landing Gear Control Electrical Schematic		125/126

EFFECTIVITY: ALL

<u>Subject</u>	<u>Chapter/ Section Subject</u>	<u>Page</u>
<u>MAIN LANDING GEAR DOOR MANUAL RELEASE SYSTEM</u>	32-33-00	
Trouble Shooting		101
Main Landing Gear Door Ground Release System		103/104
<u>LANDING GEAR HYDRAULIC ALTERNATE EXTENSION SYSTEM</u>	32-36-00	
General		101
Supplemental Data		101
Fault Isolation		101
Hydraulic Alternate Extension System		
Hydraulic Diagram		103/104
Component Location Index		107
Hydraulic Alternate Extension System		
Component Locator		108
Landing Gear Does Not Extend		109
Hydraulic Alternate Extension System		
Electrical Schematic		110
<u>LANDING GEAR MECHANICAL ALTERNATE EXTENSION SYSTEM FAULT ISOLATION</u>	32-37-00	
General		101
Supplemental data		101
Fault Isolation		101
Mechanical Alternate Extension System		
Mechanical Diagram		102
Component Location Index		104
Mechanical Alternate Extension System		
Component Locator		105
Landing Gear Does Not Extend		106
<u>BRAKE SYSTEM</u>	32-43-00	
General		101
Fault Isolation		101
Component Location Index		102
Brake System Component Locator		103
Brake Application Faults		107
Brake Temperature Abnormal		110
Brakes Noisy or Grab at Low Speed		111/112
Brake System Electrical Schematic		113/114

EFFECTIVITY: ALL

<u>Subject</u>	<u>Chapter/ Section Subject</u>	<u>Page</u>
<u>ANTISKID CONTROL SYSTEM</u>	<u>32-44-00</u>	
General		101
Fault Isolation		101
Component Location Index		103
Antiskid Control System Component Location		104
All or Group of Four Wheel Lights Out		
During Test		105
One Wheel Light Out During Test		106
Wheel Lights On, No Test in Progress		107
ON Light Out, OFF Light On, NORM SYS B		
Selected		108
ON Light Out, OFF Light On, ALT SYS C		
Selected		109
System Will Test With ALT SYS C Selected		110
Antiskid Control Power Electrical Schematic		111/112
<u>BRAKE TEMPERATURE INDICATING SYSTEM</u>	<u>32-45-00</u>	
Fault Isolation		101
Component Location Index		102
Brake Temperature Indicating System		
Component Locator		103
Brake Temperature Indicating System Check		104
Brake Temperature Indicating System		
Electrical Schematic		105/106
<u>BRAKE PRESSURE INDICATING SYSTEM</u>	<u>32-46-00</u>	
General		101
Fault Isolation		101
Component Location Index		102
Brake Pressure Indicating System Component		
Locator		103
BRAKE ACCUM LOW PRESS Light Faults		104
Dual Brake System Pressure Indicator Faults		105
Brake Pressure Indicating System Electrical		
Schematic		106
<u>PARKING BRAKE SYSTEM</u>	<u>32-48-00</u>	
General		101
Fault Isolation		101
Component Location Index		103
Parking Brake System Component Locator		104

<u>Subject</u>		<u>Chapter/ Section Subject</u>	<u>Page</u>
<u>PARKING BRAKE SYSTEM (CONT)</u>		32-48-00	
R	Brake Hydraulic Pressure Bleeds Down		
R	Rapidly		105
	Parking Brake Indicator Lights Do Not Come On		106
	Parking Brake Release Abnormal		108
	Parking Brake Will Not Set		110
	With Parking Brake Set, Park Knob Retracts to Off Position		112
	Parking Brake System Electrical Schematic		113/114
<u>NOSE GEAR STEERING SYSTEM</u>		32-51-00	
	General		101
	Supplemental data		101
	Fault Isolation		101
	Nose Gear Steering Hydraulic Diagram		103/104
	Component Location Index		105/106
	Nose Landing Gear Steering System Component Locator		107/108
	No Rudder Pedal or Handwheel Steering		109
	Handwheel Steering		112
	Nose Gear Shakes When Wheels Are Rotating		113
	Aircraft Pulls to Left or Right during taxiing		114
	Nose Gear Steering System Electrical Schematic		115
	Nose Landing Gear Steering System Electrical Schematic		116
<u>LANDING GEAR POSITION INDICATING AND WARNING SYSTEM FAULT ISOLATION</u>		32-61-00	
	General		101
	Fault Isolation		101
	Component Location Index		103
	Landing Gear and Door Position Indicating and Warning System Component Locator		104
	TRUCK Light On Intermittently		106
	IN TRANS Light On With Gear Extended		107
	LEFT GEAR, NOSE GEAR, RIGHT GEAR Light Not On With Gear Extended		109

<u>Subject</u>	<u>Chapter/ Section Subject</u>	<u>Page</u>
<u>LANDING GEAR POSITION INDICATING AND WARNING SYSTEM FAULT ISOLATION (CONT)</u>	32-61-00	
LH GEAR OR DOOR, NOSE GEAR OR DOOR, RH GEAR OR DOOR Light On With Gear Up or Down		110
TAIL SKID Light Does Not Come On During Tail Skid Retraction Or Extension		111
IN TRANS Light Does Not Come On		112
LEFT GEAR, NOSE GEAR, RIGHT GEAR Light On With Gear Up		113
IN TRANS Light On With Gear Retracted		114
TRUCK Legend On, Truck Level		116
TAIL SKID Light Does Not Go Off After Tail Skid Extension		117
TAIL SKID Light Does Not Go Off After Tail Skid Retraction		118
TAIL SKID Light Goes On After Tail Skid Retraction With LANDING GEAR Control Lever In NEUTRAL		119
RH GEAR OR DOOR, LH GEAR OR DOOR, or NOSE GEAR OR DOOR Light Off Intermittently While Gear Is In Transit		120
Landing Gear and Door Position Indicating and Warning System Electrical Schematic		121/122
Truck Position Indicating System Electrical Schematic		131/132
Tail Skid Position Indicating System Electrical Schematic		135/136
<u>AIR/GROUND SENSING SYSTEM</u>	32-63-00	
General		101
Fault Isolation		101
Component Location Index		103
Air/Ground Safety Sensor Component Location		104
Nose Gear Steering Relay Not Energized When Aircraft On Ground		106
Main Landing Gear Air/Ground Sensing Relays Not Energized On Ground		107
Air/Ground Sensing Relays Energized In Air (MLG)		108
Air/Ground Sensing Relays Energized In Air (NLG)		109/110
Air/Ground Sensing Electrical Schematic		111/112

EFFECTIVITY: ALL

<u>Subject</u>	<u>Chapter/ Section Subject</u>	<u>Page</u>
<u>AIR/GROUND SENSING SYSTEM (CONT)</u>	32-63-00	
Air/Ground Sensing System Electrical Schematic		113/114
<u>TAIL SKID CONTROL SYSTEM</u>	32-71-00	
General		101
Supplemental data		101
Fault Isolation		101
Tail Skid Hydraulic Diagram		103/104
Component Location Index		105/106
Tail Skid Control System Component Location		107/108
Tail Skid Does Not Retract		109
Tail Skid Does Not Extend		110
TAIL SKID Light Comes On When LANDING GEAR Control Lever Is In NEUTRAL		111
R Tail Skid Control System Electrical R Schematic		112

EFFECTIVITY: ALL

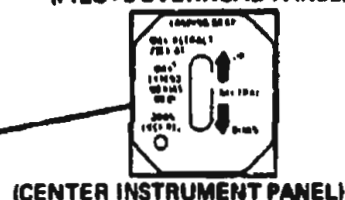
LANDING GEAR CONTENTS

ANTISKID



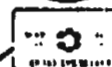
(PILOTS OVERHEAD PANEL)

ANTISKID
LANDING GEAR
RETRACTION
LANDING GEAR
EXTENSION
MANUAL GEAR
EXTENSION



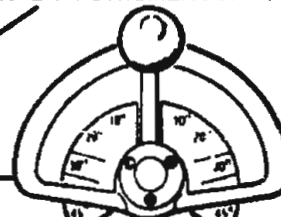
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LANDING GEAR
RETRACTION
LANDING GEAR
EXTENSION
MANUAL GEAR
EXTENSION



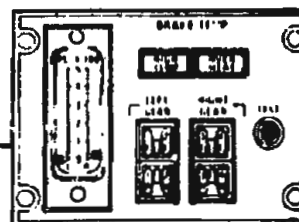
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BRAKE SYSTEM
PARKING BRAKE
BRAKE PRESSURE DROP
ANTISKID
BRAKE SYSTEM
PARKING BRAKE
NOSE WHEEL STEERING



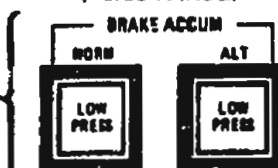
(CAPT SIDE CSL)

BRAKE TEMPERATURE

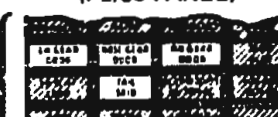


(FE/50 PANEL)

BRAKE SYSTEM
PARKING BRAKE
BRAKE PRESSURE DROP
LANDING GEAR
RETRACTION
LANDING GEAR
EXTENSION
MANUAL GEAR
EXTENSION
TAIL SKID



(FE/50 PANEL)



(FE/50 PANEL)

TITLE	CHAP/SEC
ANTISKID	.3244
BRAKE PRESSURE DROP	.3248
BRAKE SYSTEM	.3243
BRAKE TEMPERATURE	.3243
LANDING GEAR EXTENSION	.3230
LANDING GEAR RETRACTION	.3230
MANUAL GEAR EXTENSION	.3231
NOSE WHEEL STEERING	.3251
PARKING BRAKE	.3248
TAIL SKID	.3271

M1-0000-32- 2932

LANDING GEAR CONTENTS

32-FI CONTENTS

Page 7

Nov 15/84

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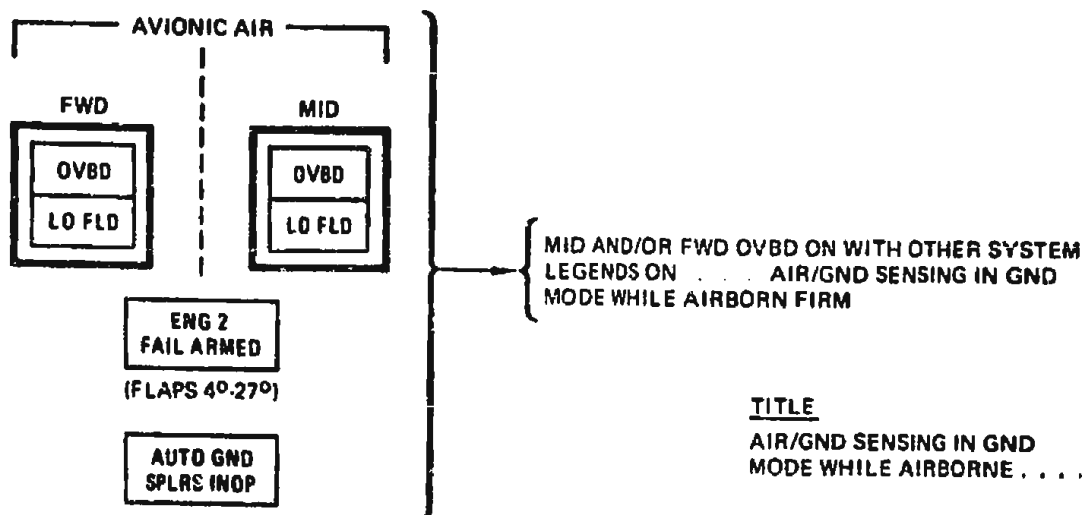
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001B

EFFECTIVITY: ALL

LANDING GEAR CONTENTS



<u>TITLE</u>	<u>CHAP/SEC</u>
AIR/GND SENSING IN GND MODE WHILE AIRBORNE	3283

M1-0000-32-2884

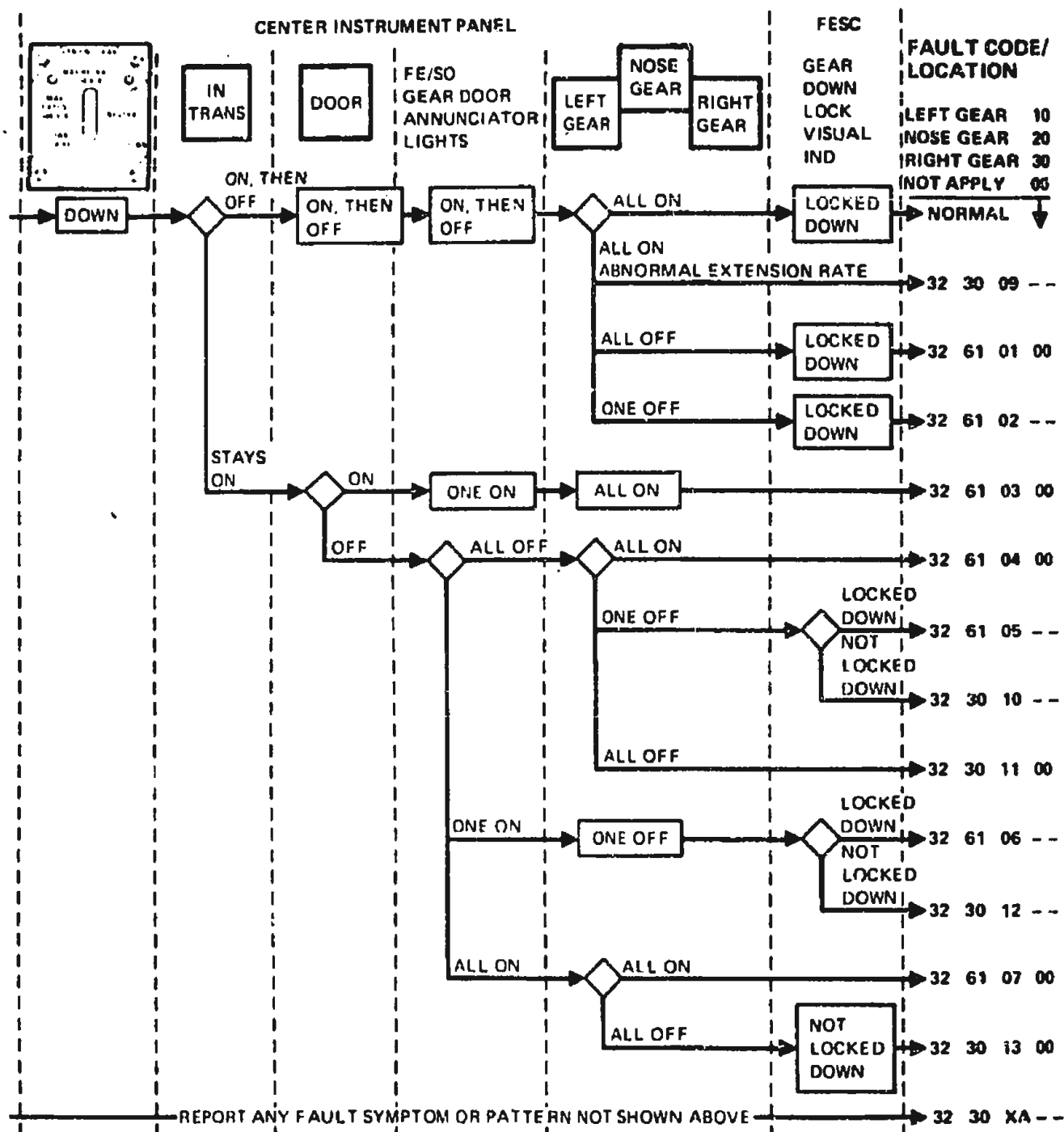
R

LANDING GEAR CONTENTS

R
R

EFFECTIVITY: ALL

001B



APPLICABLE CIRCUIT BREAKERS

1L10 PROX SWITCH PWR NO 1

2F16

TRUCK LEVEL

2L8

MLG GND SENSE

1L11 PROX SWITCH PWR NO 4

2F17

GEAR CONT NO 1

3H3

PROXIMITY SWITCH 2

1L13 LANDING GEAR DOOR POS IND

2F18

GEAR CONT NO 2

3H4

PROXIMITY SWITCH 3

11-1 0008 12 014

R

Landing Gear Extension - Fault Codes
Figure 1

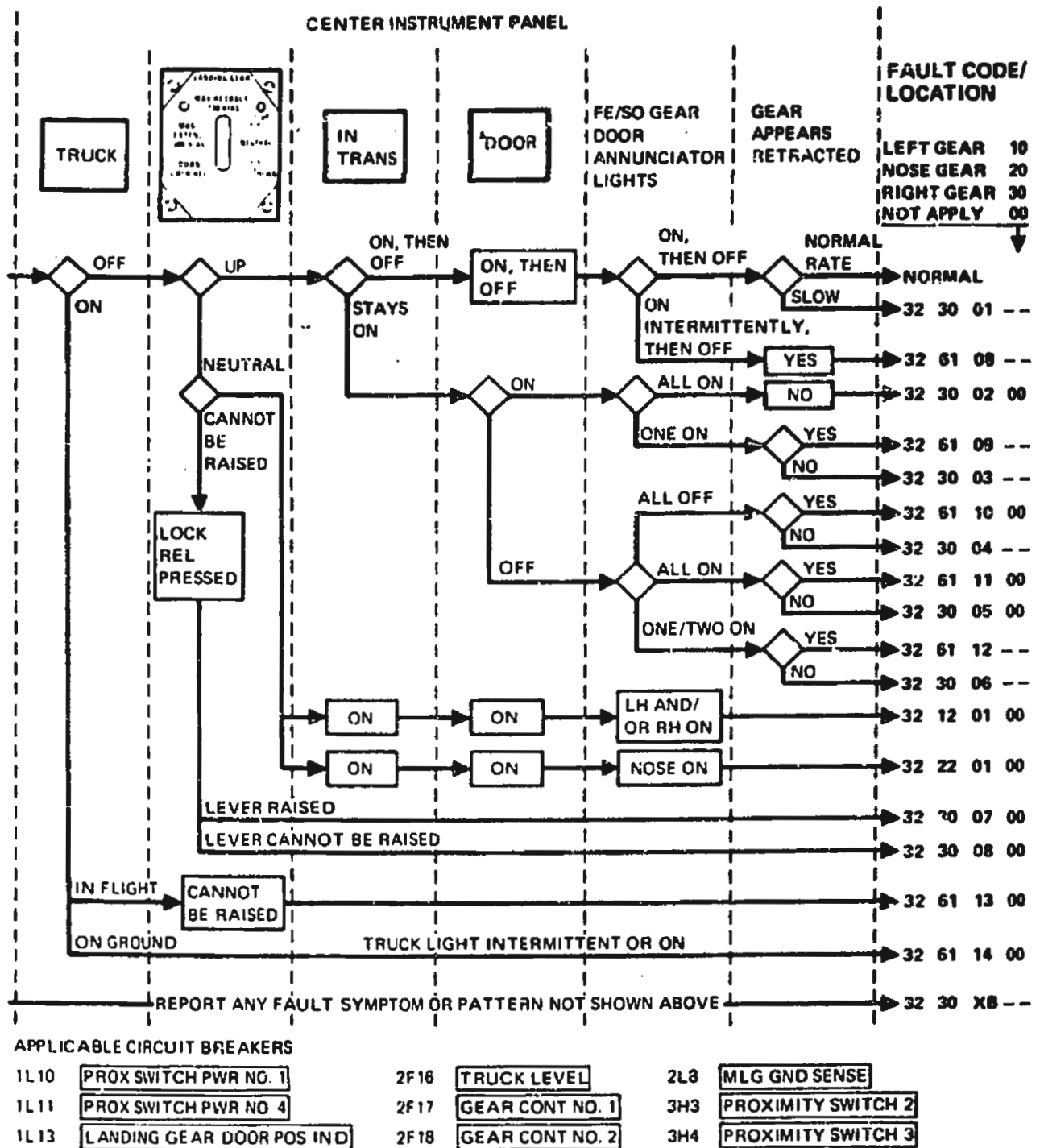
EFFECTIVITY: ALL

32-FAULT CODE DIAGRAM

Page 1

May 15/82

0508



EOI 0010-32 010

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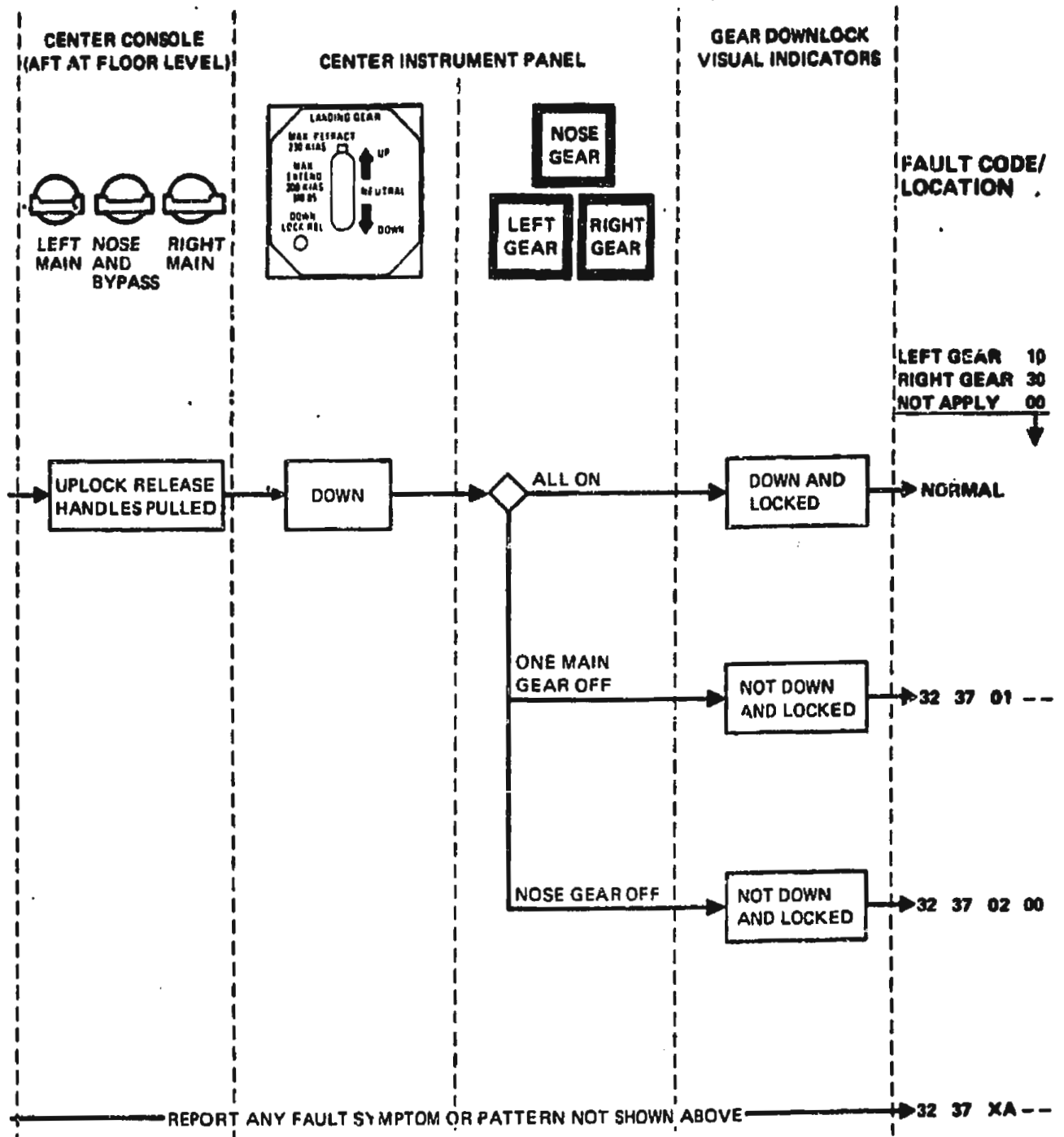
Landing Gear Retraction - Fault Codes
Figure 2

EFFECTIVITY: ALL

32-FAULT CODE DIAGRAM

Page 2
May 15/82

0508



ED1-0006-32-013

R

Manual Gear Extension - Fault Codes
Figure 3

EFFECTIVITY: ALL

32-FAULT CODE DIAGRAM

Page 3

May 15/82

050B

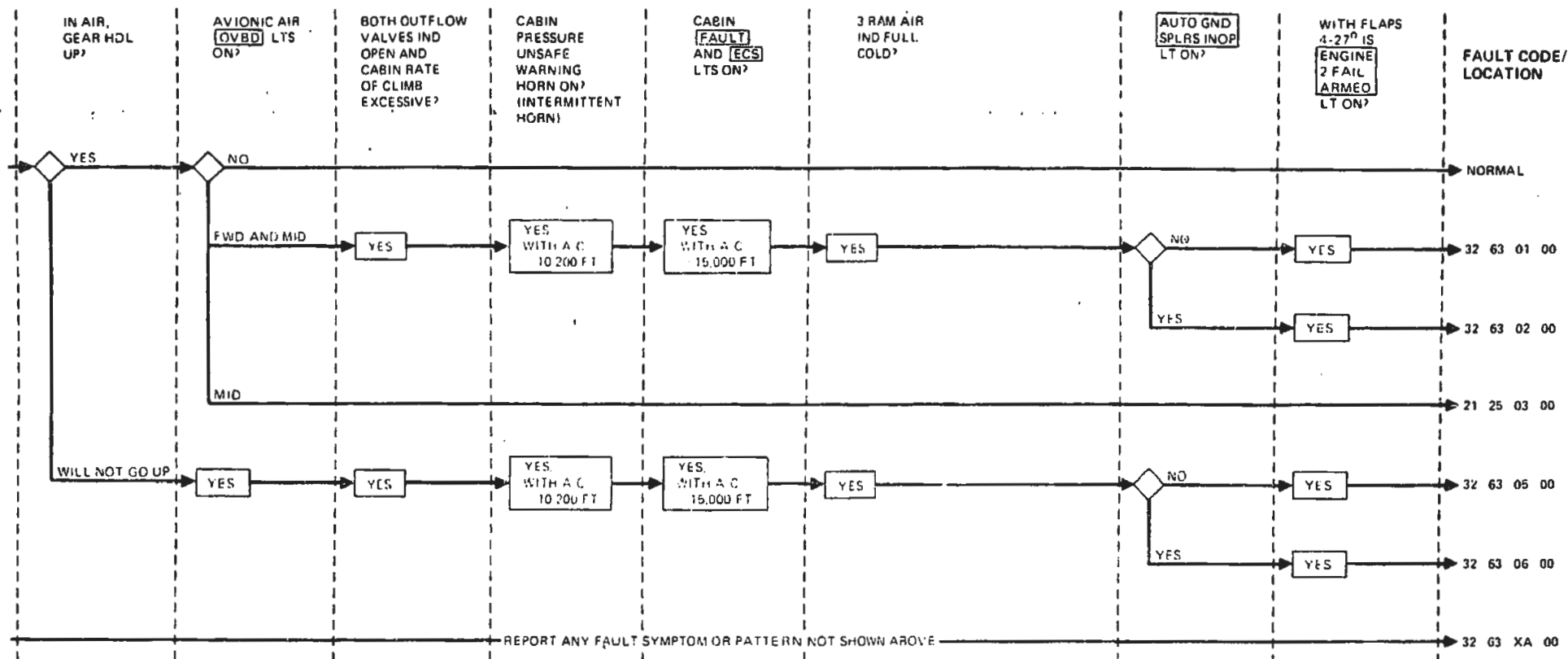
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EFFECTIVITY: ALL

32-FAULT CODE DIAGRAM

Page 4
Nov 15/84



APPLICABLE CIRCUIT BREAKERS

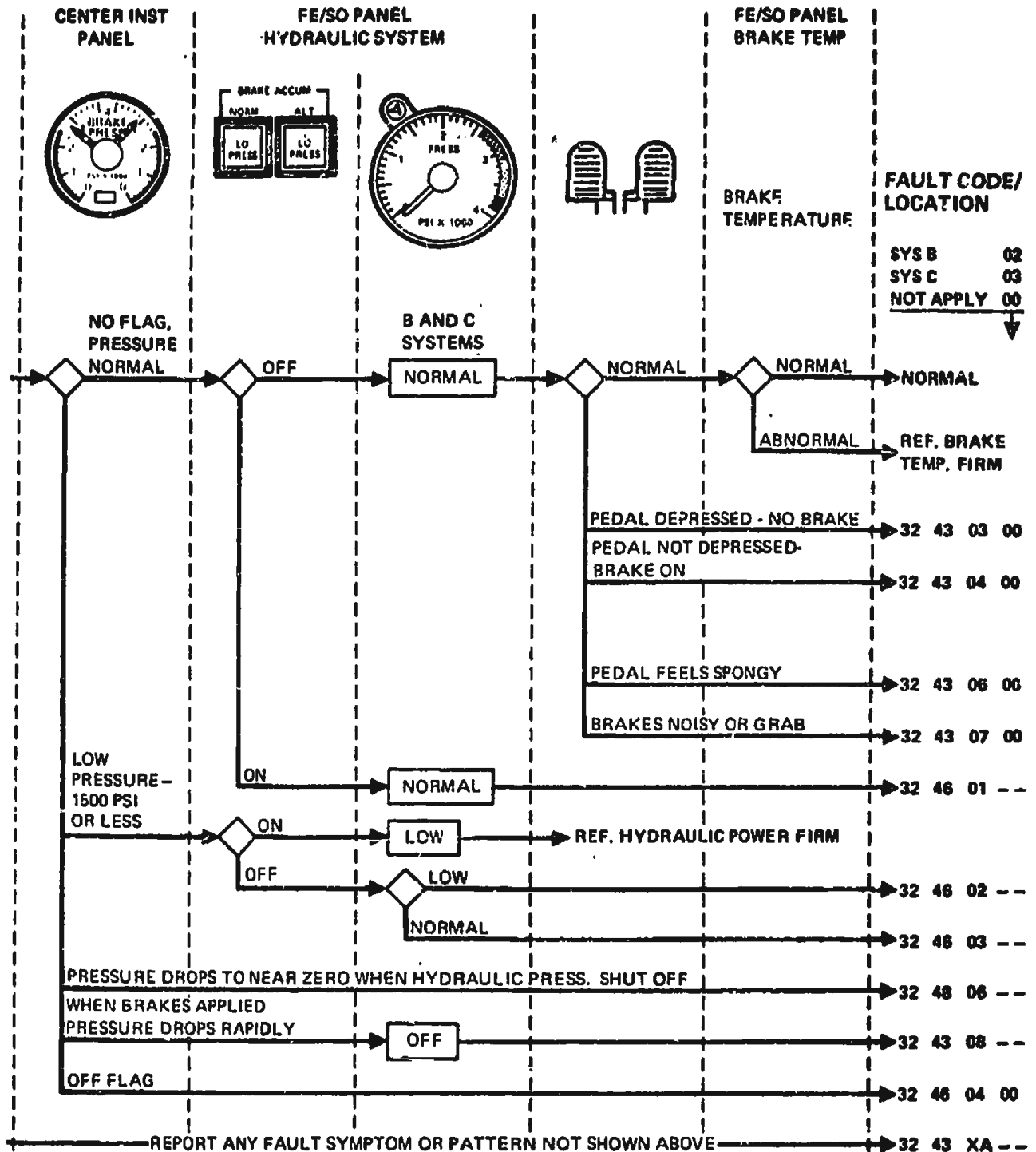
- 1L10 PROX SW PWR NO. 1
- 1L11 PROX SW PWR NO. 4
- 2L8 MLG GND SENSE
- 2F16 GEAR TRUCK LEVEL
- 3H4 PROXIMITY SWITCH 3
- GLB22 MLG DOORS PWR GND SVCE

R AIR/GND Sensing in GND MODE While Airborne - Fault Codes
Figure 4

EFFECTIVITY: ALL

32-FAULT CODE DIAGRAM

Page 5/6
Dec 15/95



ED1-0008-32-036

R

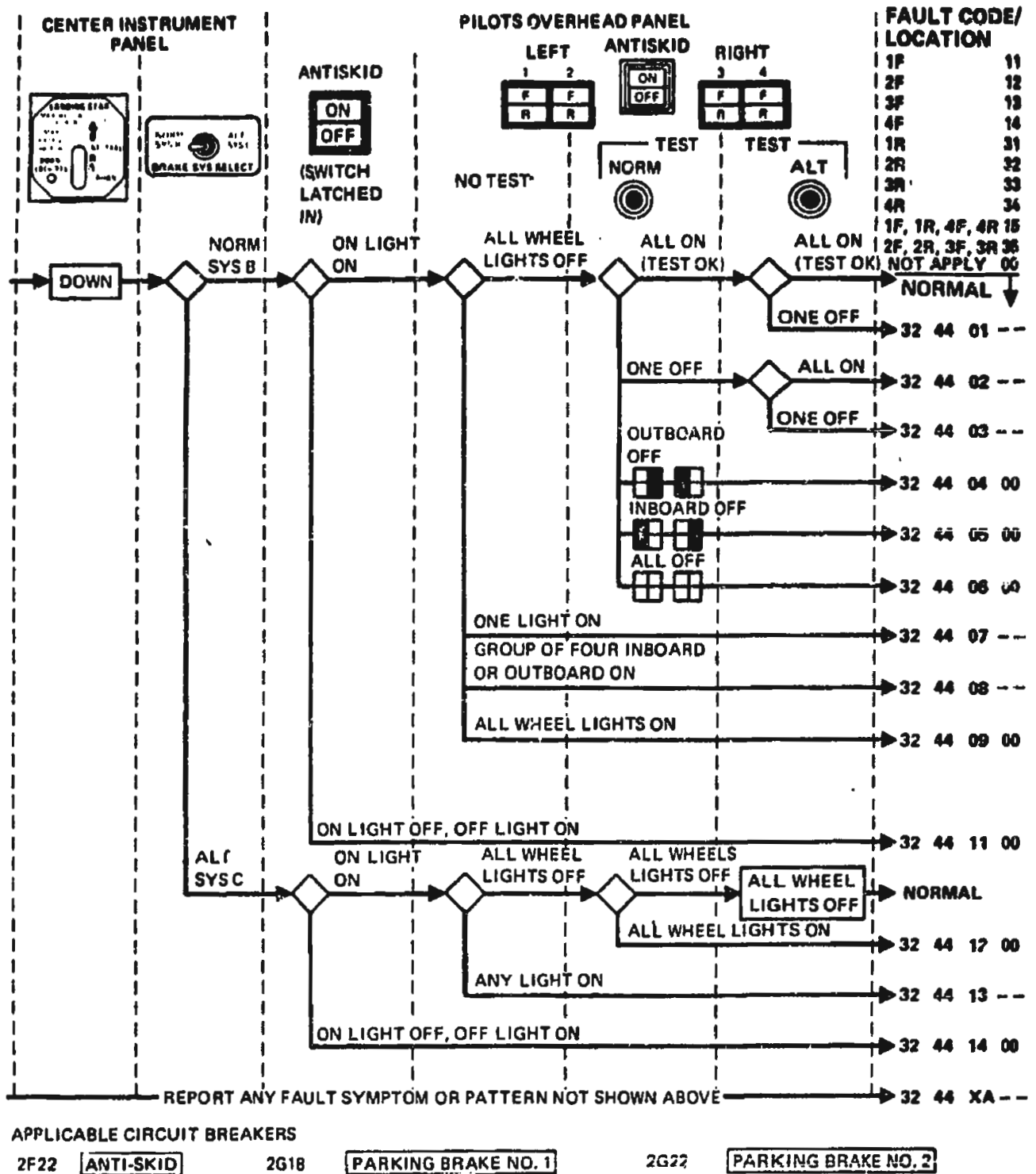
Brake System - Fault Codes
Figure 5

32-FAULT CODE DIAGRAM

Page 7
Nov 15/87

EFFECTIVITY: ALL

0508



ED1-0009-32-009

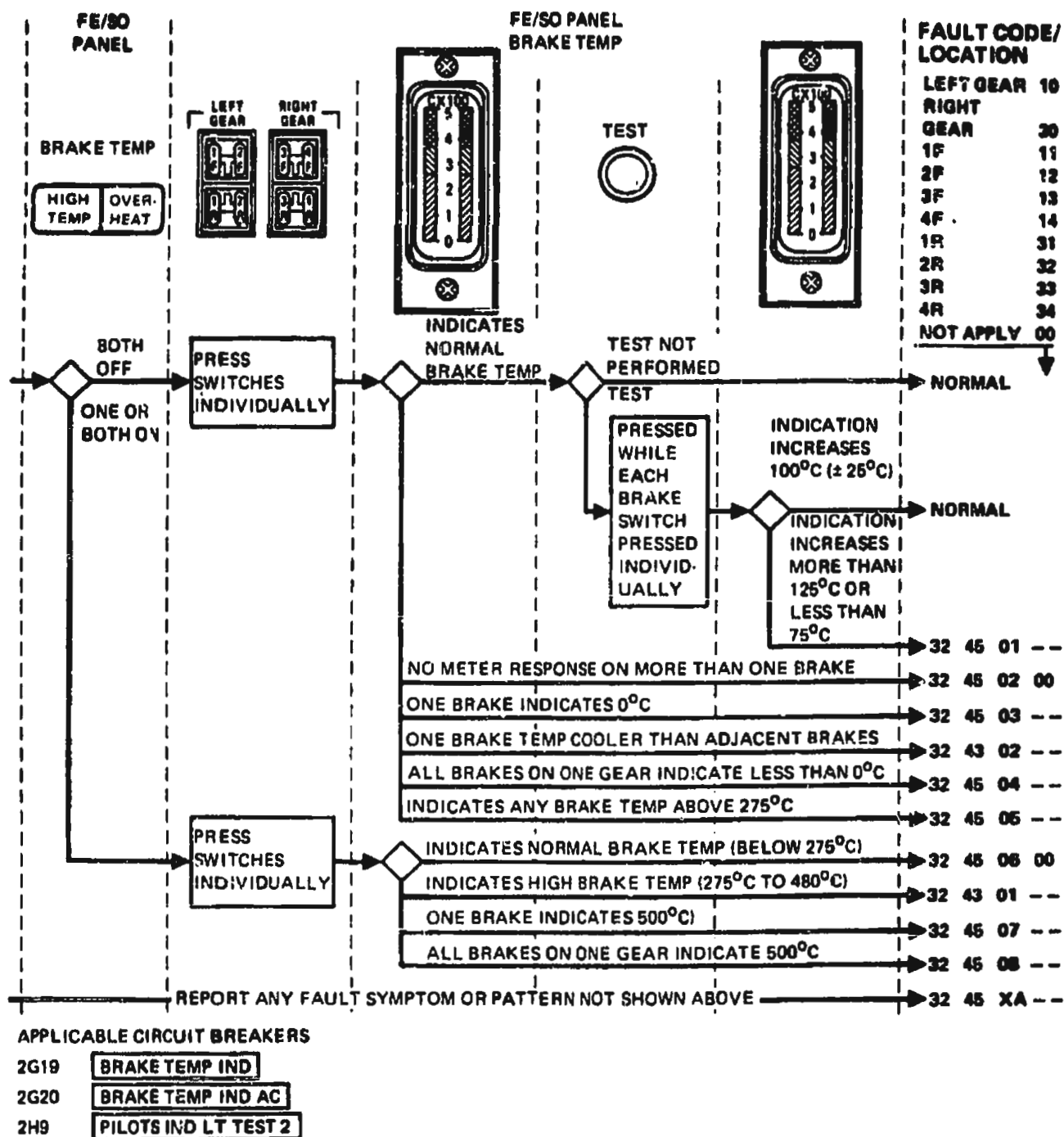
Antiskid - Fault Codes
Figure 6

32-FAULT CODE DIAGRAM

Page 8
Nov 15/84

EFFECTIVITY: ALL

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ED1-0006-32-027

Brake Temperature - Fault Codes
Figure 7

32-FAULT CODE DIAGRAM

Page 9
Nov 15/84

R
R
050B EFFECTIVITY: ALL

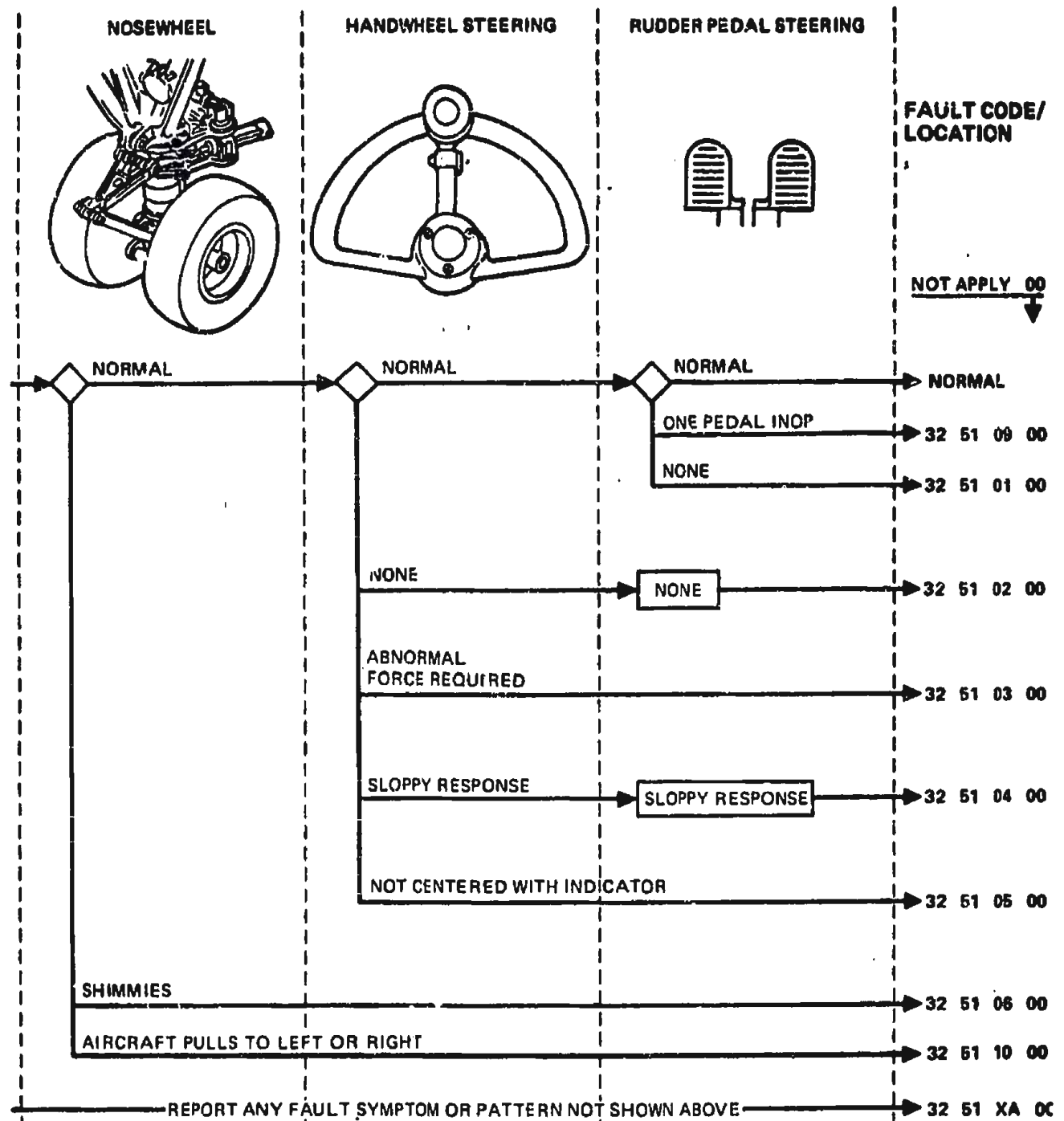


Parking Brake - Fault Codes

Figure 8

32-FAULT CODE DIAGRAM

Page 10
Nov 15/88



APPLICABLE CIRCUIT BREAKERS

2F19 NOSE STEERING

2L8 MLG GND SENSE

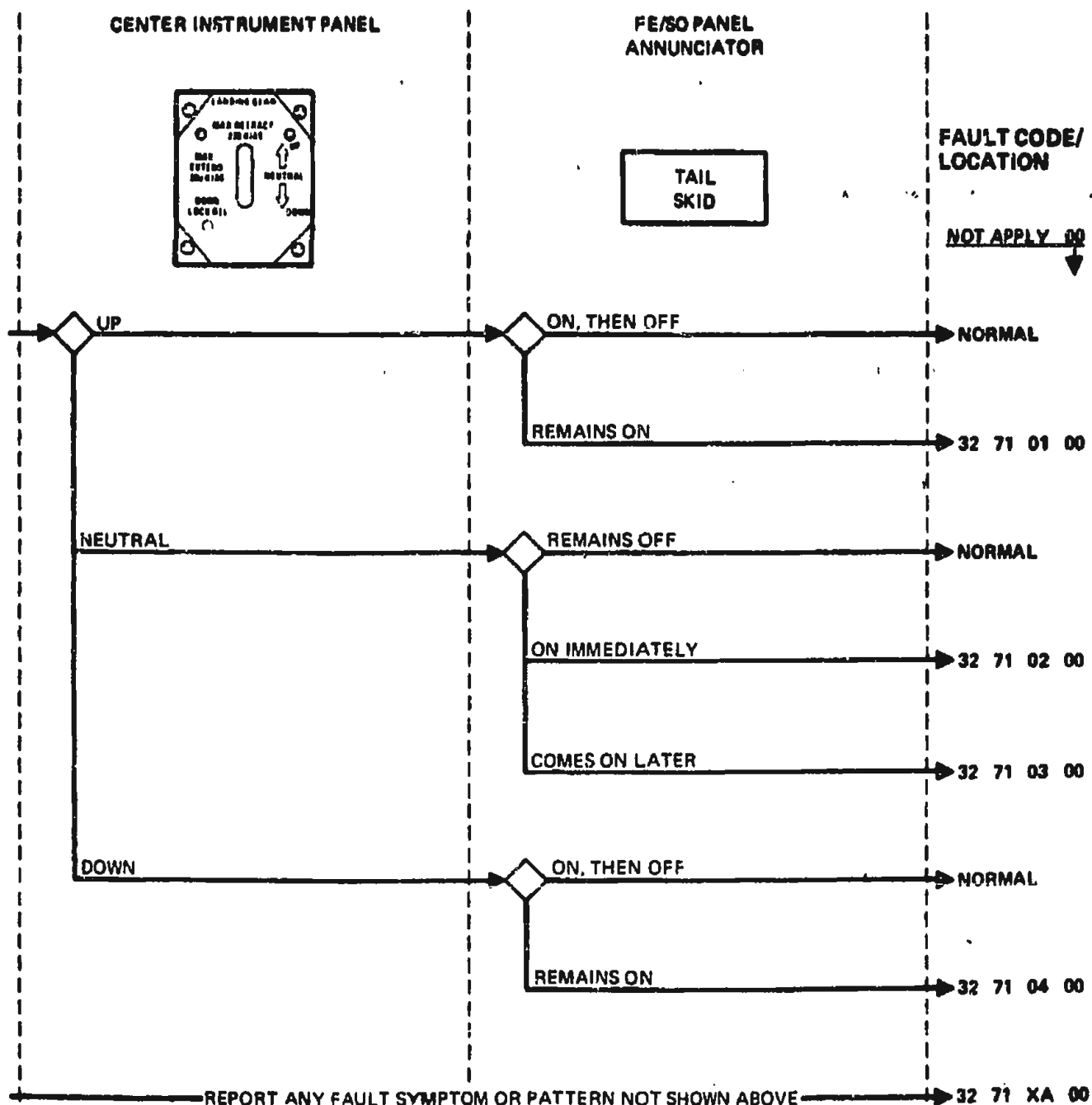
ED1-0008-32-016

Nose Gear Steering - Fault Codes
Figure 9

32-FAULT CODE DIAGRAM

Page 11
Nov 15/84

R EFFECTIVITY: ALL
R
0508



APPLICABLE CIRCUIT BREAKERS

1L13	LANDING GEAR DOOR POS IND
2F12	TAIL SKID CONT
2F13	TAIL SKID IND
3H4	PROXIMITY SWITCH 3

ED1-0001-32-041

Tail Skid - Fault Codes
Figure 10

32-FAULT CODE DIAGRAM

Page 12
Nov 15/84

R EFFECTIVITY: ALL
R
0506

FAULT CODE INDEX
TABLE 1

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
32 30 XA —	1. A Landing Gear Extension fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.) 2. 32-30-00 Fig. 104, 105, 106, 107 Block 1
32 30 XB —	1. A Landing Gear Retraction fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.) 2. 32-30-00 Fig 104, 105, 106, 107 Block 1
32 37 XA —	1. A Manual Gear Extension fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.) 2. 32-37-00 Fig. 104 Block 1
32 43 XA —	1. A Brake System fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.) 2. 32-43-00 Fig. 103, 104 Block 1
32 44 XA —	1. An Antiskid fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.) 2. 32-44-00 Fig 103, 104, 105, 106, 107, 108 Block 1

R
R

EFFECTIVITY: ALL

050B

32-FAULT CODE INDEX
Page 1
Dec 15/93

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT
	2. FAULT ISOLATION REFERENCE
32 45 XA ____	1. A Brake Temperature fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.) 2. 32-45-00 Fig 103 Block 1
32 48 XA 00	1. A Parking Brake fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.) 2. 32-48-00 Fig 103, 104, 105, 106, 107 Block 1
32 51 XA 00	1. A Nose Gear Steering fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.) 2. 32-51-00 Fig. 104, 105, 106 Block 1
32 63 XA 00	1. An AIR/GND Sensing in GND MODE While Airborne fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.) 2. 32-63-00 Fig. 105 (Sheet 1) Block 1
32 71 XA 00	1. A Tail Skid fault was encountered by the crew which is not covered in the fault code diagram. (Ref. Fault Code diagram for flight crew actions.) 2. 32-71-00 Fig. 104, 105, 106 Block 1

FAULT CODE INDEX TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
32 12 01 00	1. IN TRANS, DOOR, and FE/SO LH GEAR DOOR and/or RH GEAR DOOR ann lights come on while acft in cruise or descent. 2. 32-12-01 Page 501 (Adjustment and Test)
32 22 01 00	1. IN TRANS, DOOR, and FE/SO NOSE GEAR DOOR ann lights come on while acft in cruise or descent. 2. 32-22-01 Page 501 (Adjustment and Test) 32-61-06 Page 501 (if fault persists)
32 30 01 _	1. (10=LEFT GEAR, 20=NOSE GEAR, 30=RIGHT GEAR) retraction slow. 2. 32-30-00 Fig. 104 (Sheet 1) Block 2
32 30 02 00	1. IN TRANS, DOOR, FE/SO gear door lights on; gear did not retract. 2. 32-30-00 Fig. 104 (Sheet 1) Block 1
32 30 03 _	1. (10=LEFT GEAR, 20=NOSE GEAR, 30=RIGHT GEAR) IN TRANS, DOOR, FE/SO door lights on; gear did not retract. 2. 32-30-00 Fig. 104 (Sheet 1) Block 2
32 30 04 _	1. (10=LEFT GEAR, 20=NOSE GEAR, 30=RIGHT GEAR) did not retract. IN TRANS light on; DOOR, FE/SO gear door lights off. 2. 32-30-00 Fig. 104 (Sheet 1) Block 1
32 30 05 00	1. IN TRANS, FE/SO gear down lights on; DOOR light off. Gear did not retract. 2. 32-30-00 Fig. 104 (Sheet 1) Block 1

R EFFECTIVITY: ALL

050B

32-FAULT CODE INDEX

Page 3
Nov 15/84

FAULT CODE INDEX TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
32 30 06 —	1. (10=LEFT GEAR, 20=NOSE GEAR, 30=RIGHT GEAR) IN TRANS, FE/SO door light on; DOOR light off. Gear did not retract. 2. 32-30-00 Fig. 104 (Sheet 1) Block 2
32 30 07 00	1. LANDING GEAR lever could not be raised; DOWN LOCK REL pushbutton depressed, lever can be raised. TRUCK light off. 2. 32-30-00 Fig. 105 Block 3
32 30 08 00	1. LANDING GEAR lever could not be raised; DOWN LOCK REL pushbutton depressed, lever cannot be raised. TRUCK light off. 2. 32-30-00 Fig. 105 Block 7
R	
32 30 09 —	1. (10=LEFT GEAR, 20=NOSE GEAR, 30=RIGHT GEAR) extension rate abnormal. 2. 32-30-00 Fig. 107 Block 5
32 30 10 —	1. (10=LEFT GEAR, 20=NOSE GEAR, 30=RIGHT GEAR) did not lock down after normal gear extension. IN TRANS light on; DOOR and FE/SO gear door lights off. 2. 32-30-00 Fig. 106 (Sheet 1) Block 2
32 30 11 00	1. IN TRANS light on; all other gear and door lights off. Gear did not extend. 2. 32-30-00 Fig. 106 (Sheet 1) Block 7
32 30 12 —	1. (10=LEFT GEAR, 20=NOSE GEAR, 30=RIGHT GEAR) IN TRANS and FE/SO door lights on. DOOR and gear downlock lights off. Gear did not lock down. 2. 32-30-00 Fig. 106 (Sheet 1) Block 2

EFFECTIVITY: ALL

0509

32-FAULT CODE INDEX

 Page 4
 Nov 15/84

FAULT CODE INDEX TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
32 30 13 00	1. IN TRANS and all FE/SO gear door lights on; DOOR and downlock lights off. Gear did not lock down. 2. 32-30-00 Fig. 106 (Sheet 1) Block 7
32 37 01 —	1. (10=LEFT GEAR, 30=RIGHT GEAR) downlock light off when gear extended manually. 2. 32-37-00 Fig. 104 Block 2
32 37 02 00	1. NOSE GEAR position light off when gear extended manually and locked. 2. 32-37-00 Fig. 104 Block 3
32 43 01 —	1. (11=1F, 12=2F, 13=3F, 14=4F, 31=1R, 32=2R, 33=3R, 34=4R) brake indicates high temp (275 degrees C to 480 degrees C), HIGH TEMP, OVERHEAT light(s) on. 2. 32-43-00 Fig. 104 Block 2
32 43 02 —	1. (11=1F, 12=2F, 13=3F, 14=4F, 31=1R, 32=2R, 33=3R, 34=4R) brake temp cooler than adjacent brakes. 2. 32-43-00 Fig. 104 Block 3
32 43 03 00	1. No brake when pedal depressed. Hydraulic press normal. 2. 32-43-00 Fig. 103 (Sheet 1) Block 2
R 32 43 04 00	1. Brake on when pedal not depressed. 2. 32-43-00 Fig. 103 (Sheet 1) Block 3
R 32 43 05 00	1. NOT USED.
32 43 06 00	1. Brake pedal action feels spongy. 2. 32-43-00 Fig. 103 (Sheet 3) Block 6
R	

EFFECTIVITY: ALL

050B

32-FAULT CODE INDEX

Page 5
Nov 15/87

FAULT CODE INDEX TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
32 43 07 00	1. Brakes make noise and have tendency to grab at low speeds. 2. 32-43-00 Fig. 105 Block 1
32 43 08 —	1. (02=SYSTEM B, 03=SYSTEM C) with hydraulic system off, brake press drops rapidly when brakes applied. 2. 32-43-00 Fig. 103 (Sheet 3) Block 4
R 32 44 01 —	1. (11=1F, 12=2F, 13=3F, 14=4F, 31=1R, 32=2R, 33=3R, 34=4R) antiskid wheel light out during ALT test, NORM tests OK. 2. 32-44-00 Fig. 104 Block 1
32 44 02 —	1. (11=1F, 12=2F, 13=3F, 14=4F, 31=1R, 32=2R, 33=3R, 34=4R) antiskid wheel light off during NORM test, ALT tests OK. 2. 32-44-00 Fig. 104 Block 1
32 44 03 —	1. (11=1F, 12=2F, 13=3F, 14=4F, 31=1R, 32=2R, 33=3R, 34=4R) antiskid wheel light off during NORM and ALT tests. 2. 32-44-00 Fig. 104 Block 1
32 44 04 00	1. Antiskid wheel lights 1F, 1R, 4F, 4R off during NORM test. 2. 32-44-00 Fig. 103 Block 3
32 44 05 00	1. Antiskid wheel lights 2F, 2R, 3F, 3R off during NORM test. 2. 32-44-00 Fig. 103 Block 3
32 44 06 00	1. All antiskid wheel lights off during NORM test. 2. 32-44-00 Fig. 103 Block 1

EFFECTIVITY: ALL

0508

32-FAULT CODE INDEX

Page 6
Nov 15/87

FAULT CODE INDEX TABLE 1 (CONTINUED)

FAULT
CODE

1. LOG BOOK REPORT
2. FAULT ISOLATION REFERENCE

32 44 07 —	1. (11=1F, 12=2F, 13=3F, 14=4F, 31=1R, 32=2R, 33=3R, 34=4R) antiskid wheel light on, no test in progress. NORM SYS B selected.
	2. 32-44-00 Fig. 105 (Sheet 1) Block 1
32 44 08 —	1. (15=1F, 1R, 4F, 4R; 35=2F, 2R, 3F, 3R) a group of four antiskid wheel lights on; no test in progress.
	2. 32-44-00 Fig. 105 (Sheet 1) Block 1
32 44 09 00	1. All antiskid wheel lights on, no test in progress.
	2. 32-44-00 Fig. 105 (Sheet 1) Block 1
32 44 10 00	1. NOT USED.
32 44 11 00	1. Antiskid ON light off, OFF light on. NORM SYS B selected.
	2. 32-44-00 Fig. 106 Block 1
32 44 12 00	1. All antiskid wheel lights on during test. ALT SYS C selected.
	2. 32-44-00 Fig. 108 Block 1
32 44 13 —	1. (11=1F, 12=2F, 13=3F, 14=4F, 31=1R, 32=2R, 33=3R, 34=4R) antiskid wheel light on no test in progress. ALT SYS C selected.
	2. 32-44-00 Fig. 105 (Sheet 1) Block 1
32 44 14 00	1. Antiskid ON light off, OFF light on. ALT SYS C selected.
	2. 32-44-00 Fig. 107 Block 1

R EFFECTIVITY: ALL

R
050B

32-FAULT CODE INDEX

Page 7
Nov 15/87

FAULT CODE INDEX TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
32 45 01 —	1. (11=1F, 12=2F, 13=3F, 14=4F, 31=1R, 32=2R, 33=3R, 34=4R) brake indication increases (more than 125 degrees C, less than 75 degrees C) during test. 2. 32-45-00 Fig. 103 Block 14
32 45 02 00	1. No meter response on more than one brake. 2. 32-45-00 Fig. 103 Block 17
32 45 03 —	1. (11=1F, 12=2F, 13=3F, 14=4F, 31=1R, 32=2R, 33=3R, 34=4R) brake indicates 0 degrees C. 2. 32-45-00 Fig. 103 Block 15
32 45 04 —	1. (10=LEFT GEAR, 30=RIGHT GEAR) all brakes on one gear indicate less than 0 degrees C. 2. 32-45-00 Fig. 103 Block 16
32 45 05 —	1. (11=1F, 12=2F, 13=3F, 14=4F, 31=1R, 32=2R, 33=3R, 34=4R) brake temp indication above 275 degrees C, HIGH TEMP and OVERHEAT lights off. 2. 32-45-00 Fig. 103 Block 14
32 45 06 00	1. All brakes indicate normal temp (below 275 degrees C), HIGH TEMP, OVERHEAT light(s) on. 2. 32-45-00 Fig. 103 Block 9
32 45 07 —	1. (11=1F, 12=2F, 13=3F, 14=4F, 31=1R, 32=2R, 33=3R, 34=4R) brake indicates 500 degrees C, HIGH TEMP, OVERHEAT light(s) on. 2. 32-45-00 Fig. 103 Block 11
32 45 08 —	1. (10=LEFT GEAR, 30=RIGHT GEAR) all brakes on one gear indicate 500 degrees C, HIGH TEMP, OVERHEAT light(s) on. 2. 32-45-00 Fig. 103 Block 12

R EFFECTIVITY: ALL

050B

32-FAULT CODE INDEX

Page 8
Nov 15/87

FAULT CODE INDEX TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
32 46 01 —	1. (02=SYSTEM B, 03=SYSTEM C) BRAKE ACCUM LOW PRESS light on. Hydraulic press normal. 2. 32-46-00 Fig. 103 Block 13
32 46 02 —	1. (02=SYSTEM B, 03=SYSTEM C) brake press and hydraulic press low, BRAKE ACCUM LOW PRESS light off. 2. 32-46-00 Fig. 103 Block 5
32 46 03 —	1. (02=SYSTEM B, 03=SYSTEM C) brake press low, hydraulic press normal, BRAKE ACCUM LOW PRESS light off. 2. 32-46-00 Fig. 104 Block 2
32 46 04 00	1. Brake press indicator OFF flag showing. 2. 32-46-00 Fig. 104 Block 4
32 48 01 00	1. Parking brake light(s) do not come on. 2. 32-48-00 Fig. 104 Block 1
32 48 02 00	1. PARK control knob will not set, brake pressure normal. 2. 32-48-00 Fig. 106 Block 1
32 48 03 00	1. Parking brakes hard to release. 2. 32-48-00 Fig. 105 Block 5
32 48 04 00	1. PARK control knob does not stow when pedals depressed. 2. 32-48-00 Fig. 105 Block 2
32 48 05 00	1. Brake pressure bleeds down more rapidly than normal, PARK light on, then off. 2. 32-48-00 Fig. 103 Block 1

R EFFECTIVITY: ALL

0508

32-FAULT CODE INDEX

Page 9
Nov 15/87

FAULT CODE INDEX TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
32 48 06 —	1. (02=SYSTEM B, 03=SYSTEM C) brake press drops to near zero when hydraulic press is shut off. 2. 32-48-00 Fig. 103 Block 6.
32 48 07 00	1. With parking brake set, PARK knob retracts to off position. 2. 32-48-00 Fig. 107 Block 1
R 32 48 08 00 R R R	1. Parking brake set, hydraulic pumps off, parking brake indicator light ON then OFF, brake pressure bleeds down rapidly after parking brakes are set. 2. 32-48-00 Fig. 103 Block 1
32 51 01 00	1. No rudder pedal steering, handwheel responds normally. 2. 32-51-00 Fig. 104 Block 5
32 51 02 00	1. Handwheel and rudder pedal steering inoperative. 2. 32-51-00 Fig. 104 Block 5
32 51 03 00	1. Handwheel requires abnormal force to operate. 2. 32-51-00 Fig. 105 Block 3
32 51 04 00	1. Handwheel and rudder pedal steering have sloppy response. 2. 32-51-00 Fig. 105 Block 8
32 51 05 00	1. Handwheel not centered with indicator. 2. 32-51-00 Fig. 105 Block 6

EFFECTIVITY: ALL

0508

32-FAULT CODE INDEX

Page 10
Nov 15/88

FAULT CODE INDEX TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
32 51 06 00	1. Nosewheel shimmies. 2. 32-51-00 Fig. 106 Block 1
32 51 07 00	1. During AUTOLAND at ROLLOUT, no rudder pedal nosewheel steering. Rudder pedals are operating normally in parallel mode. Handwheel steering operates normally. 2. 32-51-00 Fig. 104 Block 5
32 51 08 00	1. During AUTOLAND at ROLLOUT, no rudder pedal nosewheel steering. Rudder pedals are operating normally in parallel mode. Handwheel steering inoperative. 2. 32-51-00 Fig. 104 Block 5
32 51 09 00	1. One rudder pedal inoperative, handwheel responds normally. 2. 32-51-00 Fig. 104 Block 2
32 51 10 00	1. Aircraft pulls to left or right during taxiing at idle engine power 2. 32-51-00 Fig. 107 Block 1
32 61 01 00	1. All gear downlock lights remain off after gear extension. DOOR and IN TRANS lights OK. 2. 32-61-00 Fig. 105 Block 7
32 61 02 —	1. (10=LEFT GEAR, 20=NOSE GEAR, 30=RIGHT GEAR) downlock light off with gear locked down. DOOR and IN TRANS lights OK. 2. 32-61-00 Fig. 105 Block 3

FAULT CODE INDEX TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
32 61 03 00	1. IN TRANS, DOOR, one FE/SO gear door ann light, and LEFT GEAR, NOSE GEAR, RIGHT GEAR lights on after gear extension. 2. 32-61-00 Fig. 104 Block 3
32 61 04 00	1. IN TRANS and gear downlock lights on; DOOR and FE/SO GEAR OR DOOR lights off after gear extension. 2. 32-61-00 Fig. 104 Block 4
32 61 05 —	1. (10=LEFT GEAR, 20=NOSE GEAR, 30=RIGHT GEAR) IN TRANS light on; DOOR, FE/SO gear door and downlock lights off after gear extension. 2. 32-61-00 Fig. 104 Block 2
32 61 06 —	1. (10=LEFT GEAR, 20=NOSE GEAR, 30=RIGHT GEAR) IN TRANS and FE/SO door light on. DOOR and gear downlock lights off. Gear locked down. 2. 32-61-00 Fig. 104 Block 7
32 61 07 00	1. IN TRANS light on; DOOR light off; FE/SO gear door and gear downlock lights on. Gear locked down. 2. 32-61-00 Fig. 104 Block 4
32 61 08 —	1. (10=LEFT GEAR, 20=NOSE GEAR, 30=RIGHT GEAR) FE/SO gear door ann lights on intermittently during gear retraction or extension. 2. 32-61-00 Fig. 115 Block 1
32 61 09 —	1. (10=LEFT GEAR, 20=NOSE GEAR, 30=RIGHT GEAR) IN TRANS, DOOR, FE/SO door lights on; gear retracted. 2. 32-61-00 Fig. 106 Block 4 32-61-00 Fig. 110 Block 17

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EFFECTIVITY: ALL

0508

32-FAULT CODE INDEX

 Page 12
 May 15/90

FAULT CODE INDEX TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
32 61 10 00	1. IN TRANS on; DOOR, FE/SO gear door lights off. Gear retracted. 2. 32-61-00 Fig. 110 Block 1
32 61 11 00	1. IN TRANS, FE/SO gear door lights on; DOOR light off. Gear retracted. 2. 32-61-00 Fig. 110 Block 1
32 61 12 —	1. (10=LEFT GEAR, 20=NOSE GEAR, 30=RIGHT GEAR) IN TRANS, FE/SO door light on. Gear retracted. 2. 32-61-00 Fig. 110 Block 2
32 61 13 00	1. TRUCK light on, LANDING GEAR lever cannot be raised. 2. 32-30-00 Fig. 105 Block 2
32 61 14 00	1. TRUCK light intermittent or on, while aircraft is on ground. 2. 32-61-00 Fig. 111 Block 1
32 63 01 00	1. FWD and AFT AVIONIC AIR OVBD lights on, both outflow valves indicate open and cabin rate-of-climb is excessive (unsafe cabin pressure warning horn may sound and ECS and cabin pressure FAULT lights may be on depending upon altitude), FMS STATUS on (SQUAT SW = ON GND), AUTO GND SPLRS INOP not on, ENGINE 2 FAIL ARMED light on (flaps in takeoff range) (other indications may occur depending upon conditions). 2. 32-63-00 Fig. 105 (Sheet 1) Block 1

EFFECTIVITY: ALL

0508

32-FAULT CODE INDEX

 Page 13
Dec 15/92

FAULT CODE INDEX
TABLE 1 (CONTINUED)

FAULT CODE	1. LOG BOOK REPORT 2. FAULT ISOLATION REFERENCE
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- | | |
|-------------|---|
| 32 63 02 00 | 1. FWD and AFT AVIONIC AIR OVBD lights on, both outflow valves indicate open and cabin rate-of-climb is excessive (unsafe cabin pressure warning horn may sound and ECS and cabin pressure FAULT lights may be on depending upon altitude), FMS STATUS on (SQUAT SW = ON GND), AUTO GND SPLRS INOP lt on, ENGINE 2 FAIL ARMED light on (flaps in takeoff range) (other indications may occur depending upon conditions).
2. 32-63-00 Fig. 105 (Sheet 1) Block 1 |
| 32 63 03 00 | 1. NOT USED. |
| 32 63 04 00 | 1. NOT USED. |
| 32 63 05 00 | 1. FWD and AFT AVIONIC AIR OVBD lights on, both outflow valves indicate open and cabin rate-of-climb is excessive (unsafe cabin pressure warning horn may sound and ECS and cabin pressure FAULT lights may be on depending upon altitude), FMS STATUS on (SQUAT SW = ON GND), AUTO GND SPLRS INOP not on, ENGINE 2 FAIL ARMED light on (flaps in takeoff range) (other indications may occur depending upon conditions).
2. 32-63-00 Fig. 105 (Sheet 1) Block 1 |
| 32 63 06 00 | 1. FWD and AFT AVIONIC AIR OVBD lights on, both outflow valves indicate open and cabin rate-of-climb is excessive (unsafe cabin pressure warning horn may sound and ECS and cabin pressure FAULT lights may be on depending upon altitude), FMS STATUS on (SQUAT SW = ON GND), AUTO GND SPLRS INOP lt on, ENGINE 2 FAIL ARMED light on (flaps in takeoff range) (other indications may occur depending upon conditions).
2. 32-63-00 Fig. 105 (Sheet 1) Block 1 |

R EFFECTIVITY: ALL

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32-FAULT CODE INDEX

Page 14
Nov 15/88

FAULT CODE INDEX
TABLE 1

FAULT CODE	1. LOG BOOK REPORT
	2. FAULT ISOLATION REFERENCE
32 71 01 00	1. TAIL SKID light remains on with LANDING GEAR lever up. 2. 32-71-00 Fig. 104 Block 1
32 71 02 00	1. TAIL SKID light comes on immediately when LANDING GEAR control lever is positioned to NEUTRAL. Landing Gear IN TRANS light (on or off). 2. 32-71-00 Fig. 106 Block 2
32 71 03 00	1. TAIL SKID light comes on after LANDING GEAR control lever had been positioned to NEUTRAL for some time. 2. 32-71-00 Fig. 106 Block 3
32 71 04 00	1. TAIL SKID light remains on with LANDING GEAR control lever DOWN. 2. 32-71-00 Fig. 105 Block 1

R EFFECTIVITY: ALL

050B

32-FAULT CODE INDEX

Page 15/16
Nov 15/88

LOCKHEED
MAINTENANCE MANUAL

LANDING GEAR--DESCRIPTION AND OPERATION

1. General

R The landing gear (Ref. Fig. 1) is a retractable tricycle-type with two main landing gear (MLG) assemblies, one nose landing gear (NLG) assembly, and a tail skid. Each MLG (Ref. Fig. 2 and 3) is equipped with dual tandem wheels. The NLG has dual steerable wheels. The tail skid is a combined retractable piston and hydraulic shock absorber to prevent damage due to overrotation. The MLG assemblies are mounted on the wings and retract inward (Ref. Fig. 3) into wells in the fuselage. The NLG retracts forward (Ref. Fig. 5) into the fuselage nosewheel well.

The tail skid retracts and extends at a slight incline from vertical through the fuselage skin contour at FS 1991. Each landing gear wheel well and strut recess area is equipped with doors that completely enclose each landing gear in the retracted position. MLG inboard doors are hydraulically actuated. Other MLG doors are either fixed to the strut or mechanically actuated. The NLG doors are controlled and operated mechanically by NLG action.

Hydraulic pressure from hydraulic system C provides power for normal landing gear extension, retraction, and nosewheel steering. When normal system pressure is lost, alternate hydraulic or alternate mechanical landing gear extension can be performed. Mechanical release is by cable-actuated uplock release, and alternate hydraulic extension is accomplished by using power stored in the hydraulic system C accumulator. Hydraulic system A provides power for extending and retracting the tail skid.

Each MLG wheel is equipped with a multiple disc-type hydraulic brake. Brake hydraulic pressure is supplied by hydraulic system B, or alternately by the accumulator in hydraulic system C. An antiskid system provides modulated control of individual wheel braking. Braking is automatically applied by reduced brake pressure during landing gear retraction to stop main wheel rotation. Since the NLG is not equipped with brakes, a friction pad wheel spin brake is mounted in the forward top end of the nosewheel well. The nosewheel rotation is stopped by the friction pad when the landing gear is fully retracted.

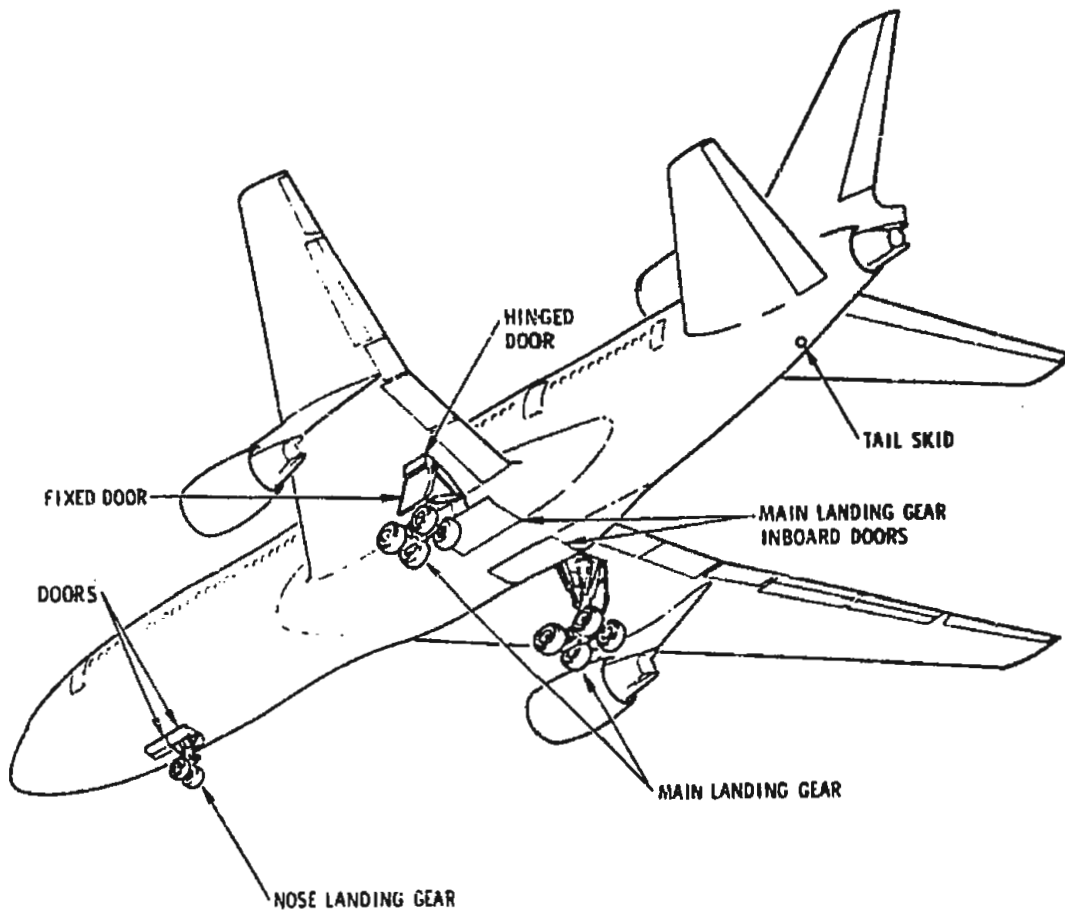
Forward NLG doors can be opened from the ground for servicing. Release of the left door is controlled manually by a handle located on the aft end of the door. A pouch in the nose gear wheel well provides flyaway stowage of ground-lock safety pins.

EFFECTIVITY: ALL

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32-00-00
Page 1
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



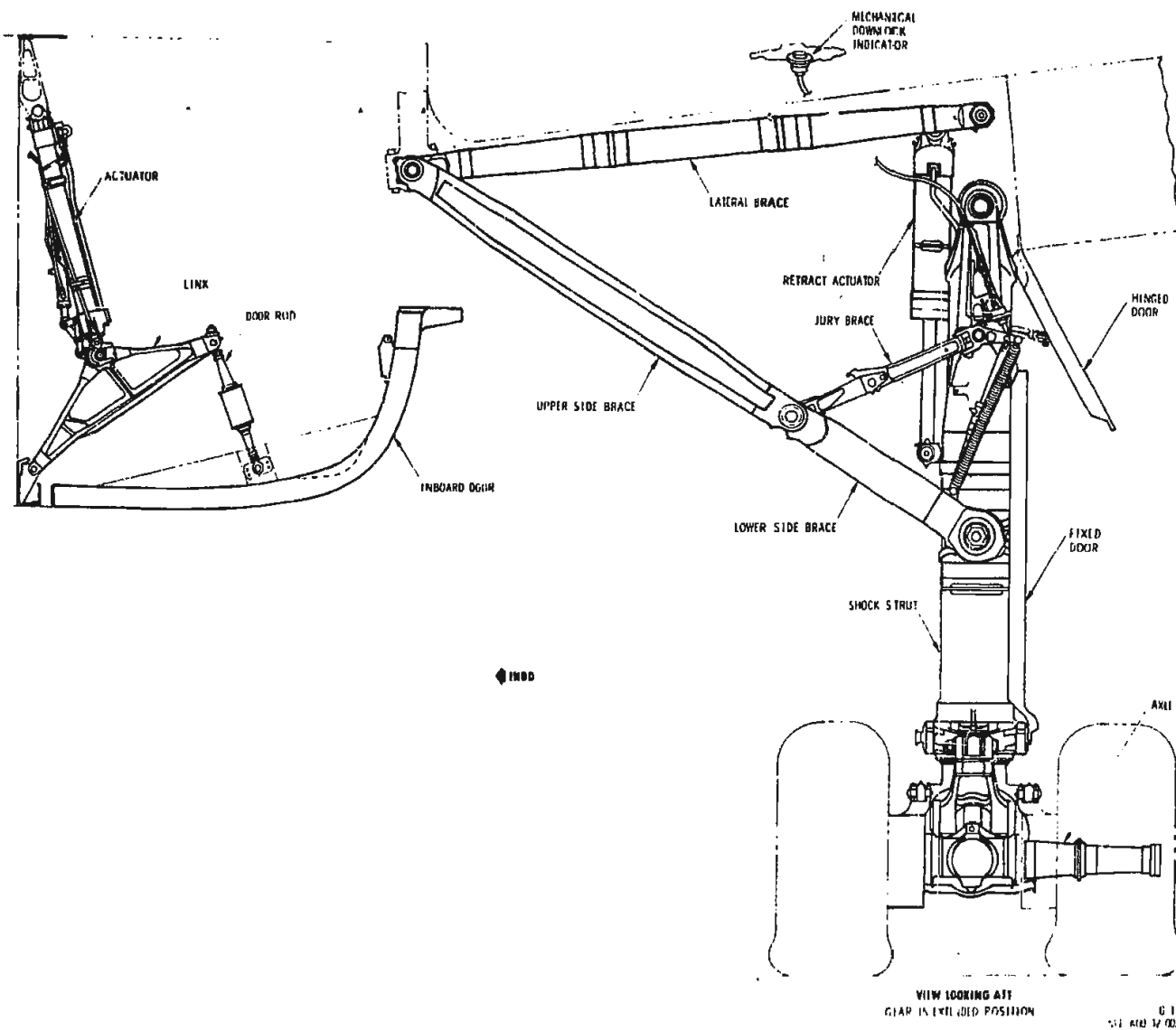
HM 6541
M1-0101-32-001

Landing Gear Location
Figure 1

EFFECTIVITY: ALL

050B

32-00-00
Page 2
Dec 1/71



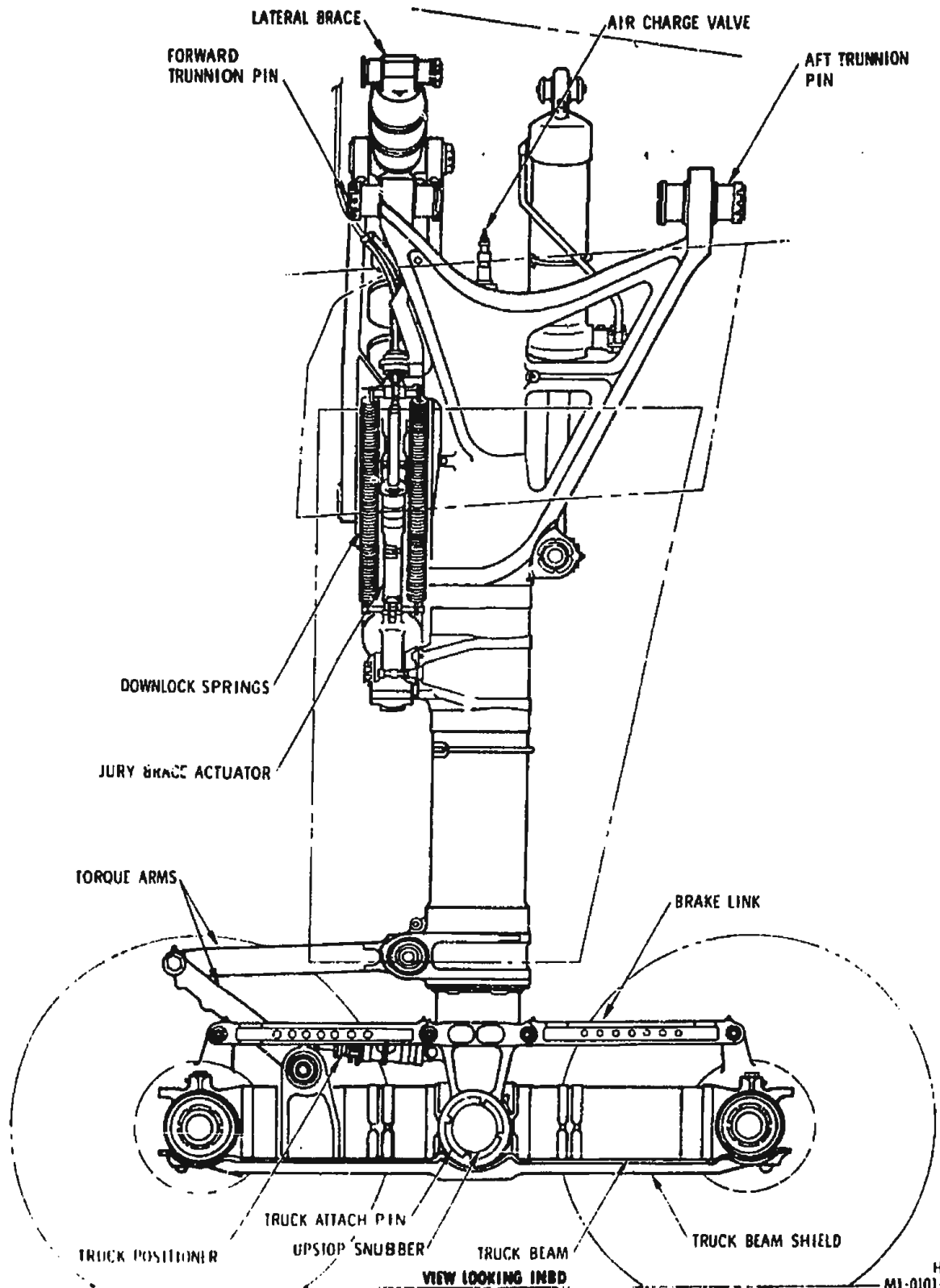
Main Landing Gear General Arrangement
Figure 2 (Sheet 1)

EFFECTIVITY: ALL

32-00-00

Page 3/4
Dec 1/71

LOCKHEED
MAINTENANCE MANUAL



HH 4498
M1-0101-32-056

**Main Landing Gear General Arrangement
Figure 2 (Sheet 2)**

EFFECTIVITY: ALL

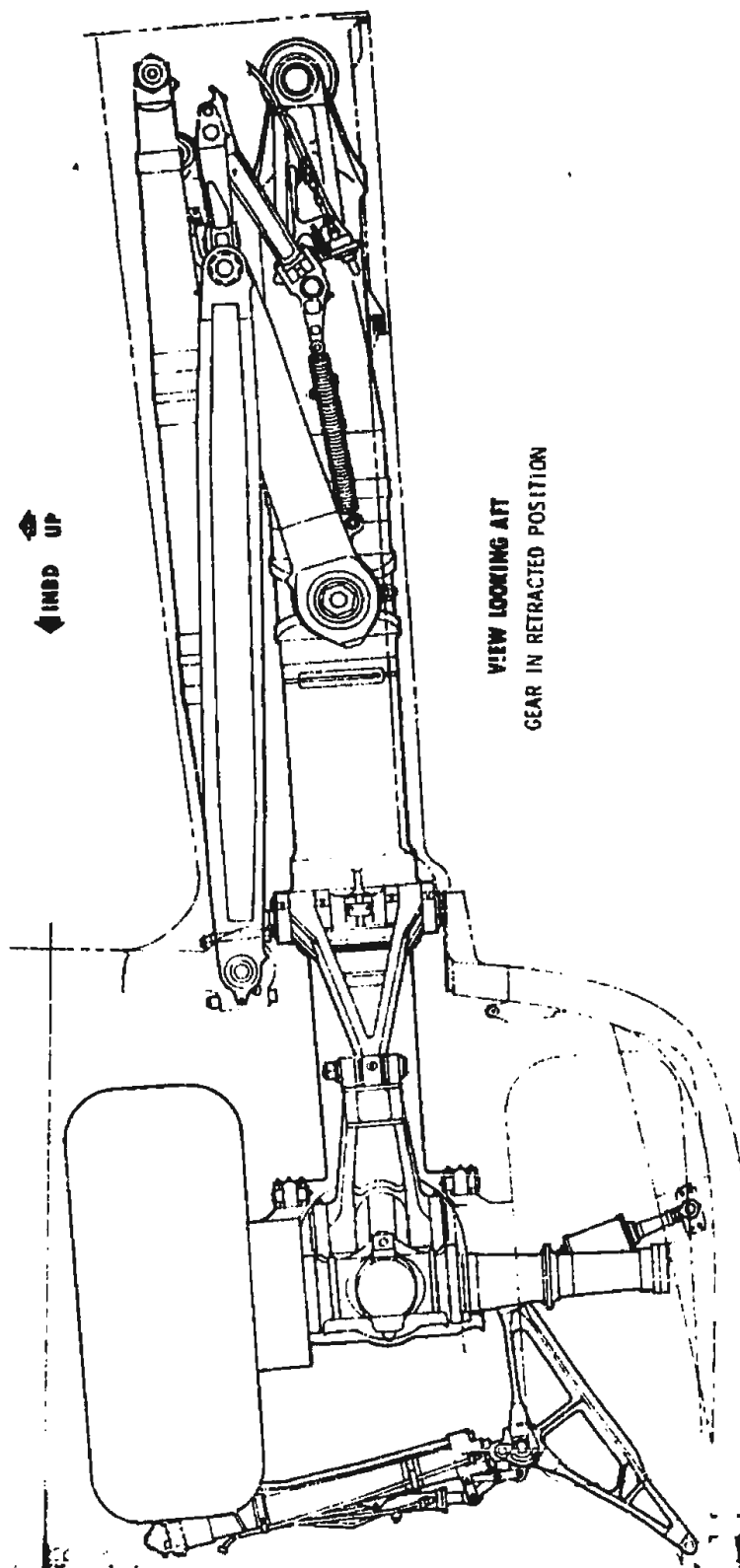
018B

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Page 5
Dec 1/72

LOCKHEED
MAINTENANCE MANUAL

HH 6542
 M1-A00-32-015



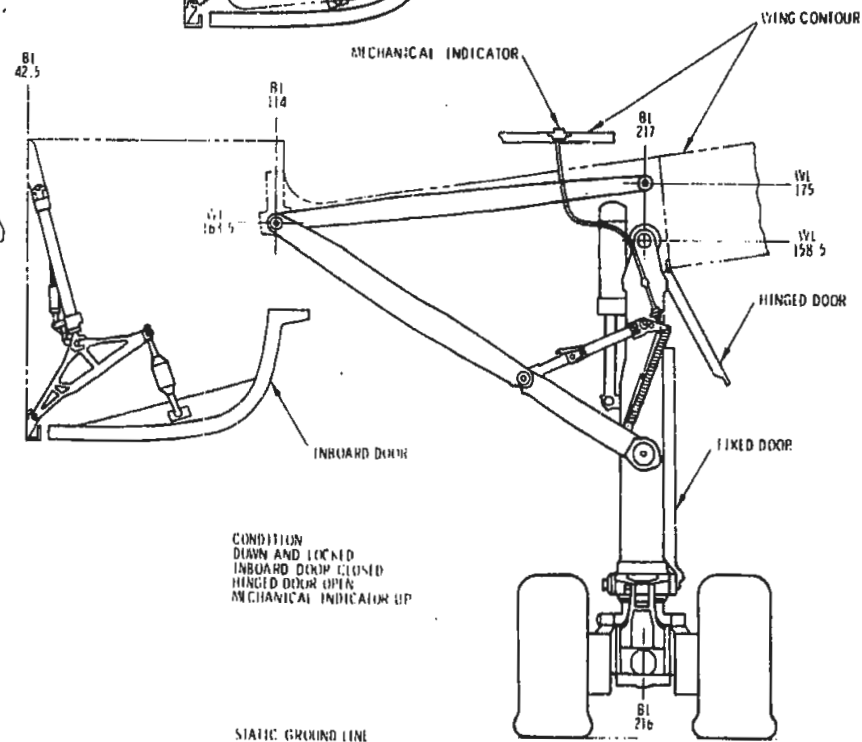
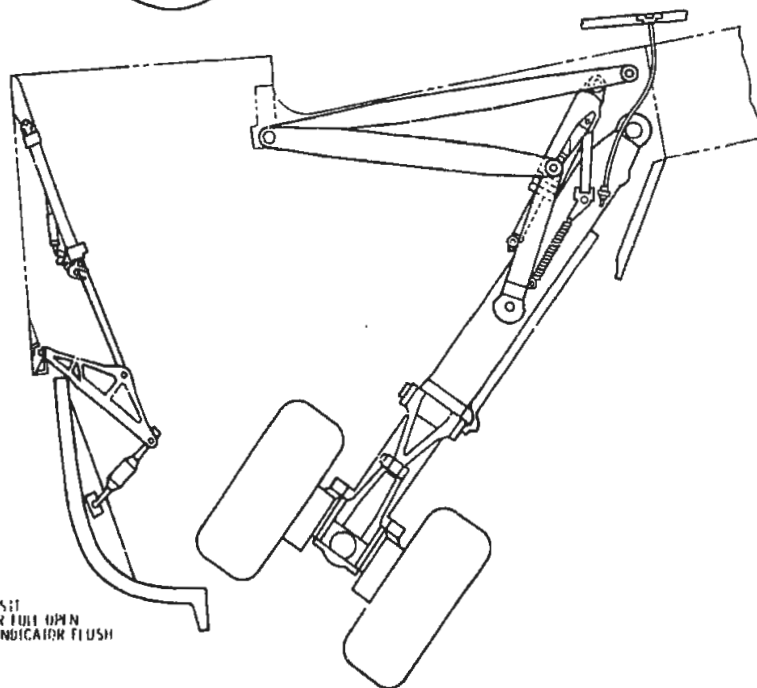
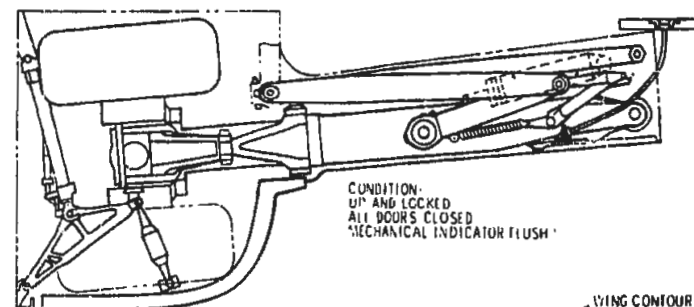
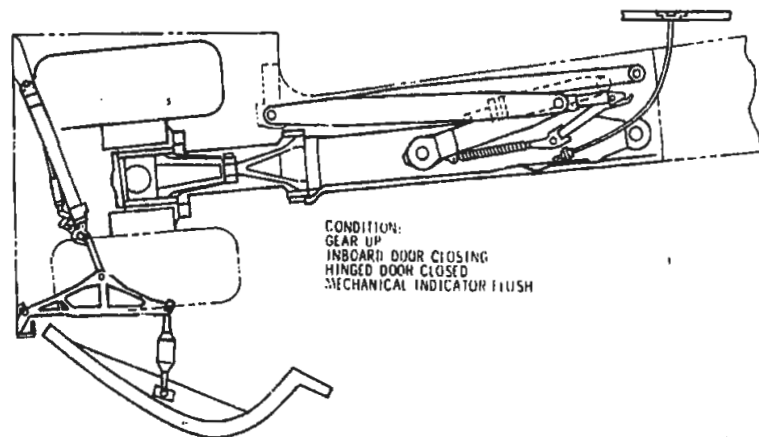
**Main Landing Gear General Arrangement
 Figure 2 (Sheet 3)**

EFFECTIVITY: ALL

32-00-00

**Page 6
 Dec 1/72**

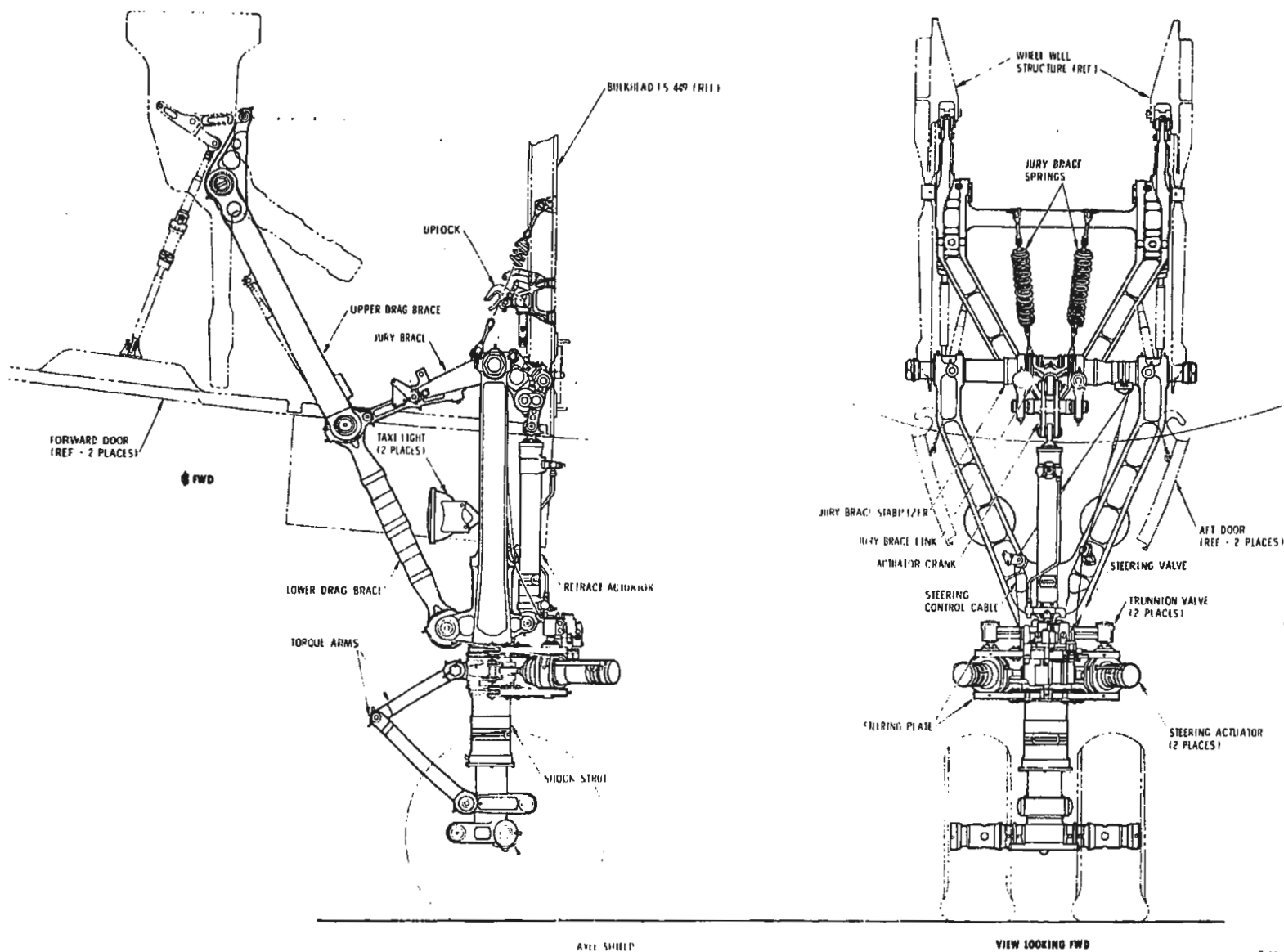
R
 R
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Main Landing Gear Operating Sequence
Figure 3

32-00-00
Page 7/8
Dec 1/72

G-35
MI-A00-32-004



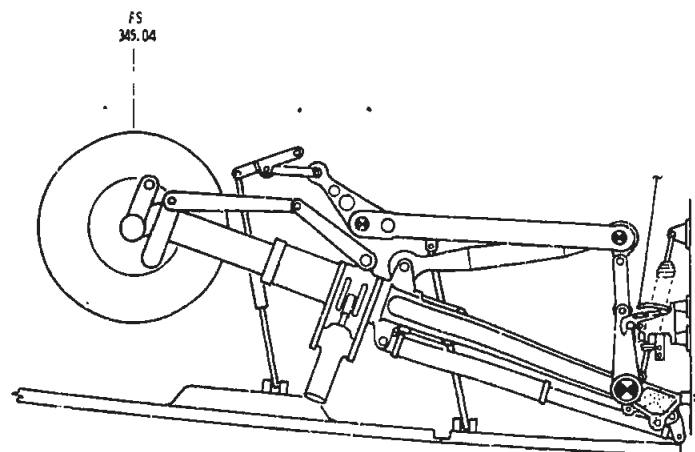
Nose Landing Gear General Arrangement
Figure 4

32-00-00
Page 9/10
Dec 1/72

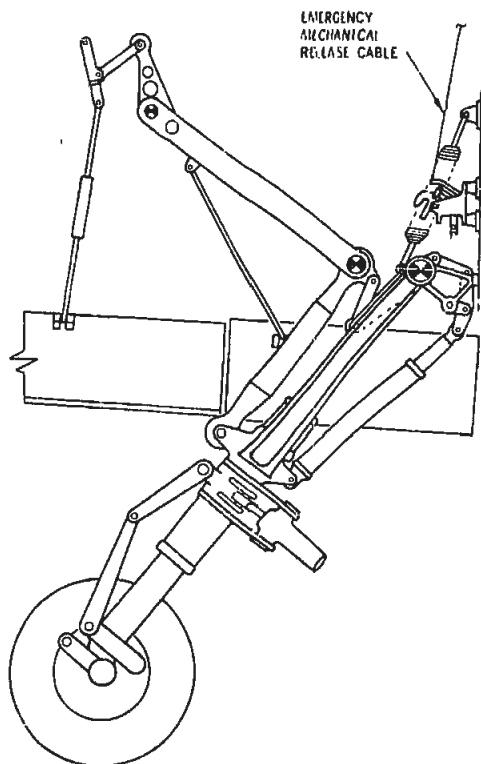
EFFECTIVITY: ALL

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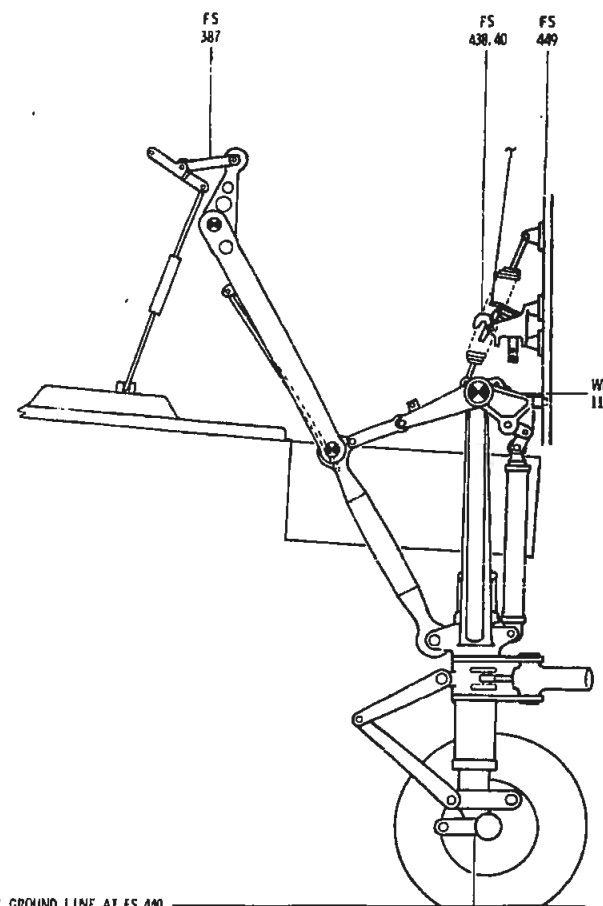
G-34
ALL A/C 32-003



CONDITION:
GEAR UP AND LOCKED,
ALL DOORS CLOSED



CONDITION:
GEAR IN TRANSIT,
ALL DOORS OPEN



CONDITION:
GEAR DOWN AND LOCKED,
FORWARD DOOR CLOSED,
A/T DOOR OPEN

Nose Landing Gear Operating Sequence
Figure 5

32-00-00
Page 11/12
Dec 1/72

EFFECTIVITY: ALL

018B



Release of the right door is accomplished by removing a quick release pin at the lower end of the door rod.

Major landing gear structural components are manufactured from heat-treated SAE 4340 steel alloy. To protect against external corrosion, all exposed components are cadmium-plated, painted with epoxy primer, and finished with a polyurethane topcoat. Welded tubular or hollow members are also treated internally.

Each MLG (Ref. Fig. 6) assembly includes:

- Four tires

- Wheels and brakes

- A nonswiveling truck

- An oleo-pneumatic shock strut assembly with integral supporting trunnion

- A spring-loaded downlock assembly

- An articulated side brace

- A retract actuator

Towing lugs for aircraft ground handling are provided on each landing gear assembly

The NLG assembly (Ref. Fig. 7) includes:

- Two wheel and tire assemblies

- An oleo-pneumatic shock strut and truss assembly

- An articulated drag strut

- A downlock assembly

- A hydraulic steering mechanism

- A retraction mechanism

The steering mechanism also acts as a shimmy damper. Integral towing lugs are located near the axle to accommodate standard tow bars.

All three shock struts and the tail skid are of the oleo-pneumatic type. The three shock struts use MIL-H-5606 hydraulic fluid. The tail skid uses hydraulic system fluid. Service fittings are located on top of each strut. The NLG shock strut has an internal centering cam. During the last four

LOCKHEED
MAINTENANCE MANUAL

inches of nose strut piston eighteen inch extension, the piston cam (upper) is engaged with the cylinder cam (lower) to assure that the NLG wheels are aligned fore and aft before gear retraction and landing.

The MLG truck consists of a longitudinal beam and two axles attached to the bottom of the shock strut piston. The forward and rear axles each mount a pair of dual wheels. A truck positioning cylinder, hydraulically actuated by hydraulic system C pressure, assures correct truck position during landing gear retraction and extension.

The wheels, which are made of forged aluminum alloy, are manufactured in two halves. Each wheel half is balanced so no special indexing is needed to preserve the balancing during assembly. The main wheels are equipped with pressure-relieving thermal fuse plugs to prevent tire blowout in case of excessive pressure from heat generated by brake applications. The filler valve incorporates a pressure blowout fuse to prevent over pressurization due to gas expansion.

R For main landing gear wheel and tire data see Maintenance
R Manual, 32-41-00. For nose landing gear wheel and tire data see
R Maintenance Manual, 32-42-00.

2. Operation

All landing gears and the tail skid extend or retract simultaneously during the normal landing gear extension and retraction (Ref. Fig. 8) cycle.

The landing gears and tail skid are controlled by the landing gear lever located on the pilots center console, zone 210. The lever can be reached and operated by either pilot. The lever has three positions: DOWN, NEUTRAL, and UP. When the landing gear lever is placed in the UP position, the MLG doors open, the gear downlocks are released, the gear retracts, and the MLG inboard doors close and lock. Moving the landing gear lever to the NEUTRAL position isolates the landing gear hydraulic system from hydraulic system C. Placing the landing gear lever in the DOWN position releases the door uplocks, opens the doors, releases the landing gear uplocks, extends the landing gear, engages the downlocks, and closes the MLG doors.

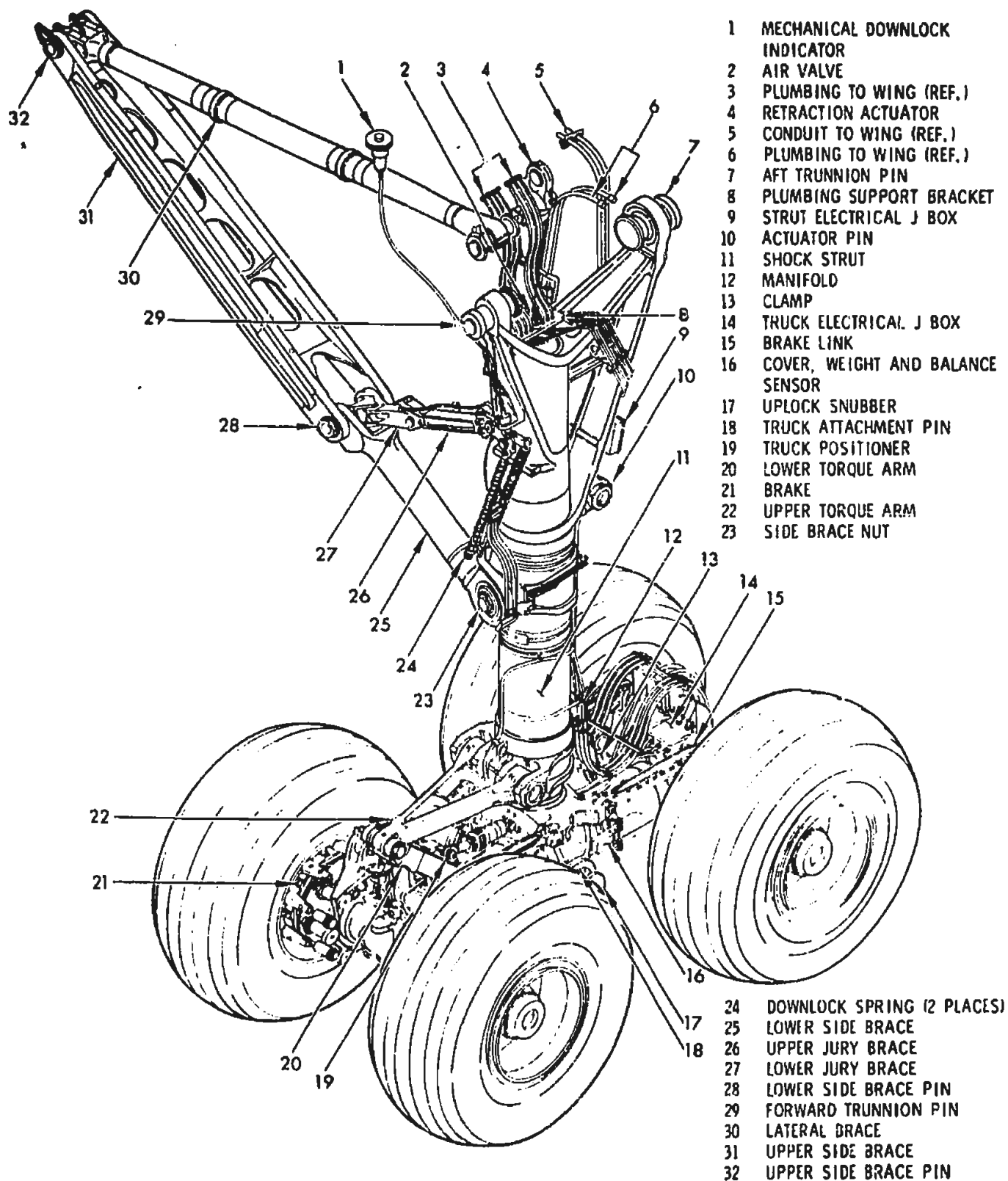
Air/ground safety sensors at each MLG torque arm sense aircraft airborne or ground status. These sensors operate the landing gear lever locking solenoid to prevent inadvertent landing gear lever movement from the DOWN position and landing gear retraction unless the shock struts are extended and the truck is level. A manual override of the safety solenoid is provided.

EFFECTIVITY: ALL

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32-00-00
Page 14
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



III 4672
M1-0101-32-007

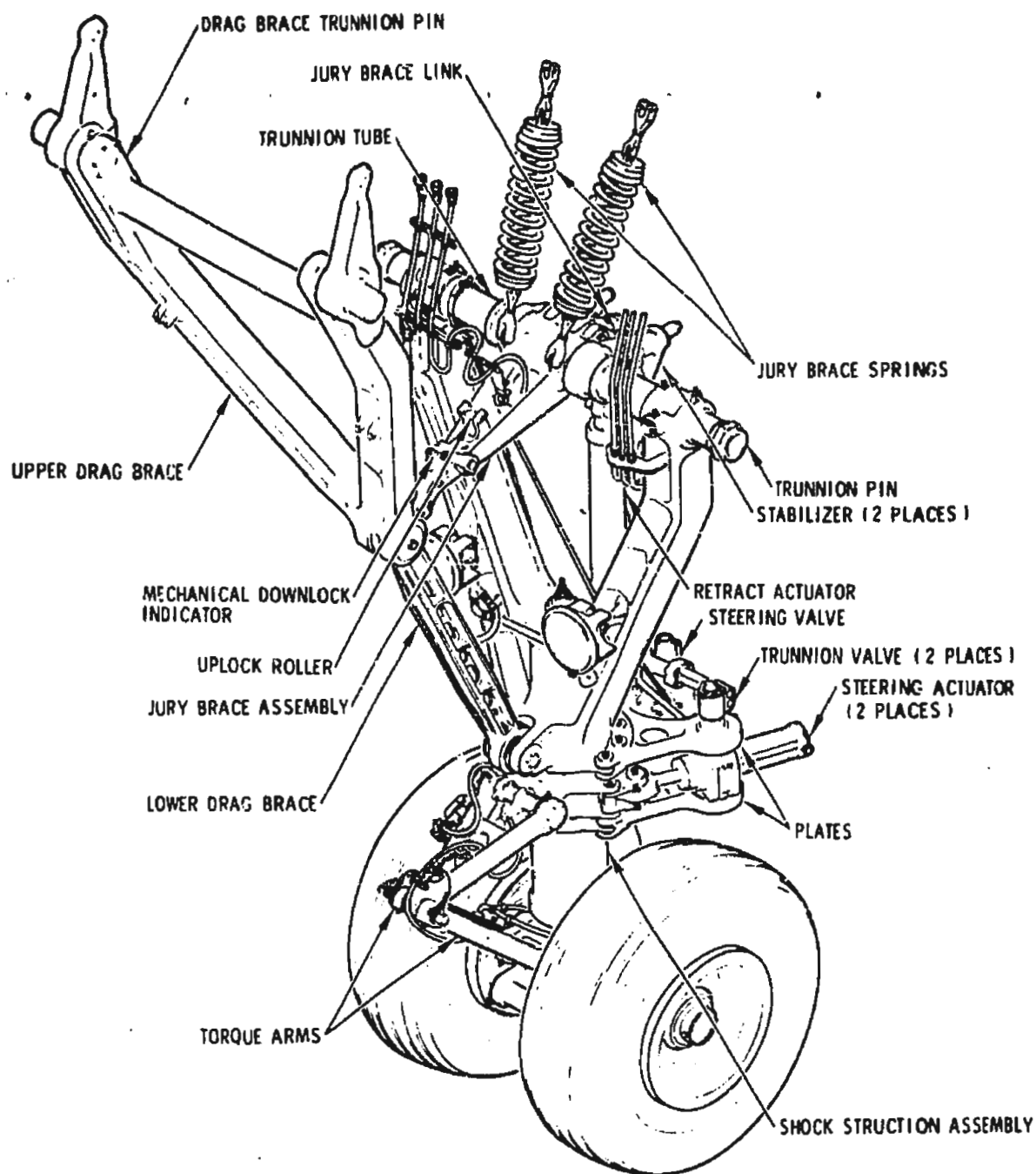
**Main Landing Gear Component Location
Figure 6**

32-00-00
Page 15
Dec 1/72

EFFECTIVITY: ALL

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LOCKHEED
MAINTENANCE MANUAL



HH 5472
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Nose Landing Gear Component Location
Figure 7

EFFECTIVITY: ALL

32-00-00

Page 16
Mar 15/73

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LOCKHEED
MAINTENANCE MANUAL

Alternate mechanical extension of the landing gear is provided by T-handles (one for each gear) located in the flight station. Cables connect directly to hydraulic system bypass valves and the uplocks. The gear will free-fall aided by aerodynamic forces. Positive locking of all gears in the down position is accomplished by jury brace springs. If alternate mechanical extension is used, the MLG doors will remain open.

An alternate means of landing gear extension is available by using hydraulic power stored in the system C accumulator. The control for this system, which is accessible to both pilots, is located in the flight station. Use of hydraulic power from the system C accumulator provides positive landing gear extension, similar to the normal procedure, except that the MLG doors will remain open.

The landing gear selector valve is electrically controlled by the landing gear lever switches. When the landing gear lever is placed in the UP position, the following occurs:

- A. The landing gear selector valve connects hydraulic system C pressure to gear-up lines, and connects system return to gear-down lines.
- B. Hydraulic fluid under pressure flows through the landing gear alternate bypass valve (in its normal position) and into gear-up lines.
- C. Flow to each MLG is regulated to 23 gpm for symmetrical retraction.
- D. Flow to the NLG is regulated to 6 gpm to achieve simultaneous operation with the MLG and to avoid slamming with high impact.
- E. Flow in the gear-up lines is routed through the MLG phase control valves to the up side of the MLG actuating cylinders and to the release side of the MLG downlock cylinders.
- F. Return flow at the respective return ports in the phase control valves is blocked to prevent retraction of the landing gears until the MLG doors open.
- G. Fluid pressure from the gear-up line is directed through the MLG phase control valves, and the door-open line to the release side of the door uplock cylinders, and the door-open side of the door actuating cylinders.
- H. As the MLG doors begin to open, a spool in each MLG phase control valve is moved by a flexible push-pull control connected to the door. This action changes the flow path in the phase control valve to permit fluid in the gear-down

EFFECTIVITY: ALL

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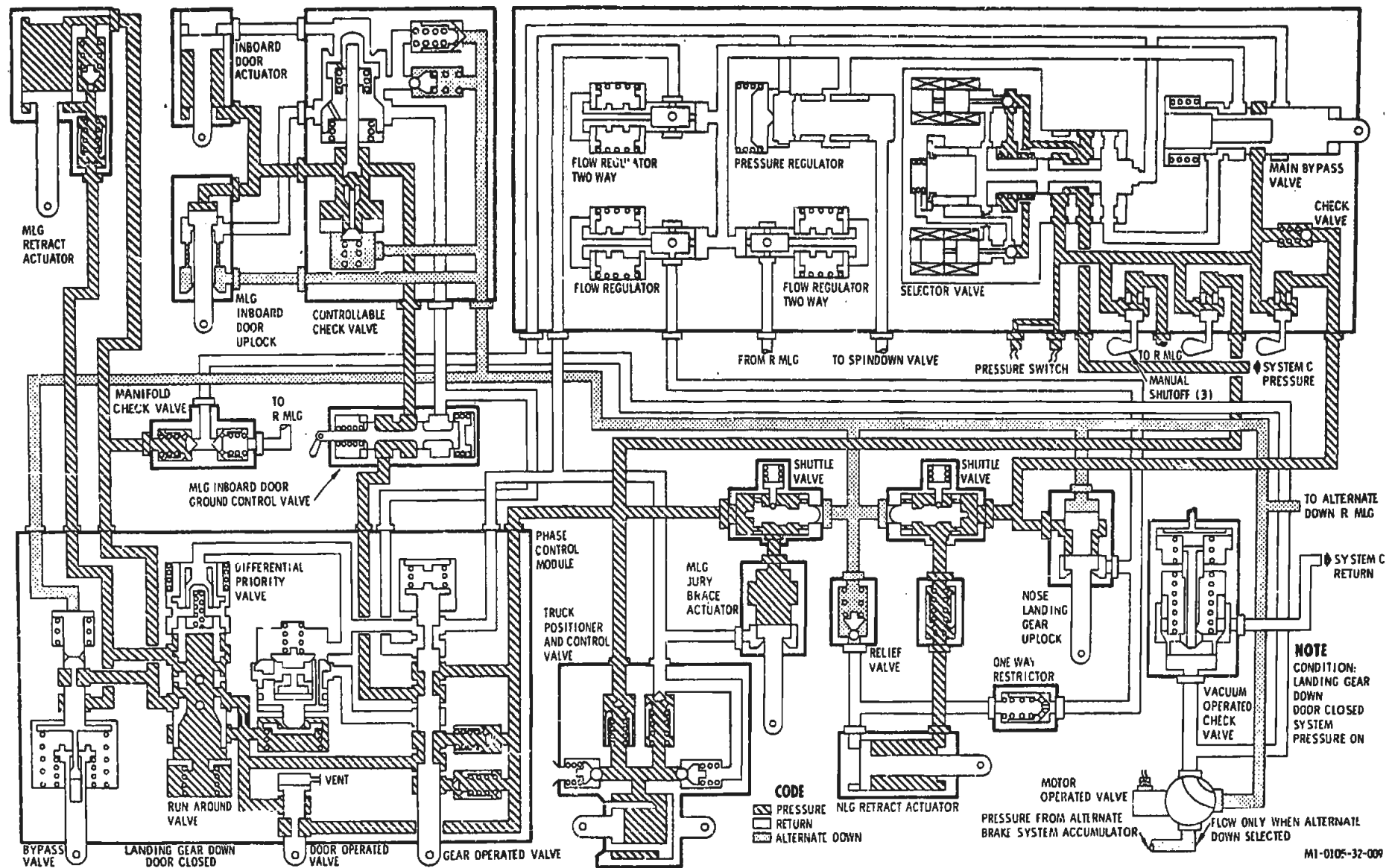
Page 17
Sep 15/73



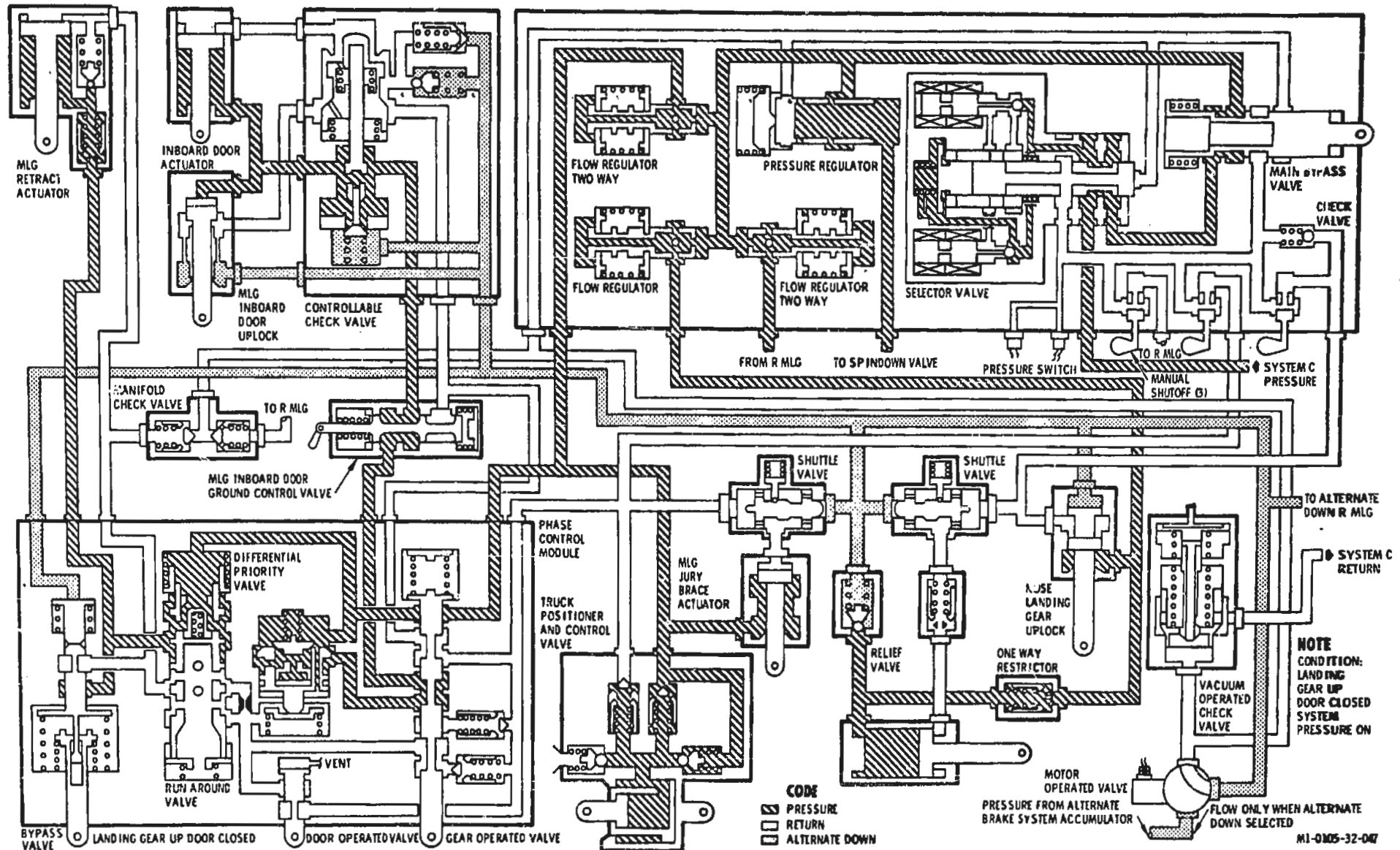
lines to flow to system return. The gear-up pressure (already available) flows to the MLG actuating cylinders and retracts the landing gear.

- I. When the landing gear is fully retracted, a second spool in each phase control valve (connected by flexible push-pull controls to each inboard door) is moved, which positions the phase control valves and directs hydraulic pressure to the door-close lines.
- J. The MLG doors close and latch.

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No door sequencing is involved for the NLG retraction and extension cycles, since the NLG doors are mechanically connected to and actuated by the NLG. When the landing gear is retracted and all doors are closed, the landing gear lever is placed in the NEUTRAL position. Placing the landing gear lever in the DOWN position actuates the landing gear selector valve to initiate the gear-down cycle. The gear-down lines are connected through the valve ports to system pressure, and the gear-up lines are connected to system return. Sequencing of doors and MLG is again accomplished through the phase control valves. Mechanical position sensing and appropriate porting of fluid in a cycle is essentially the reverse of landing gear retraction.



Landing Gear Hydraulic Schematic
Figure 8 (Sheet 1)



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Landing Gear Hydraulic Schematic
Figure 8 (Sheet 2)

EFFECTIVITY: 001-031 WITHOUT SB29-065

32-00-00
Page 21/22
Sep 15/80

(111F)

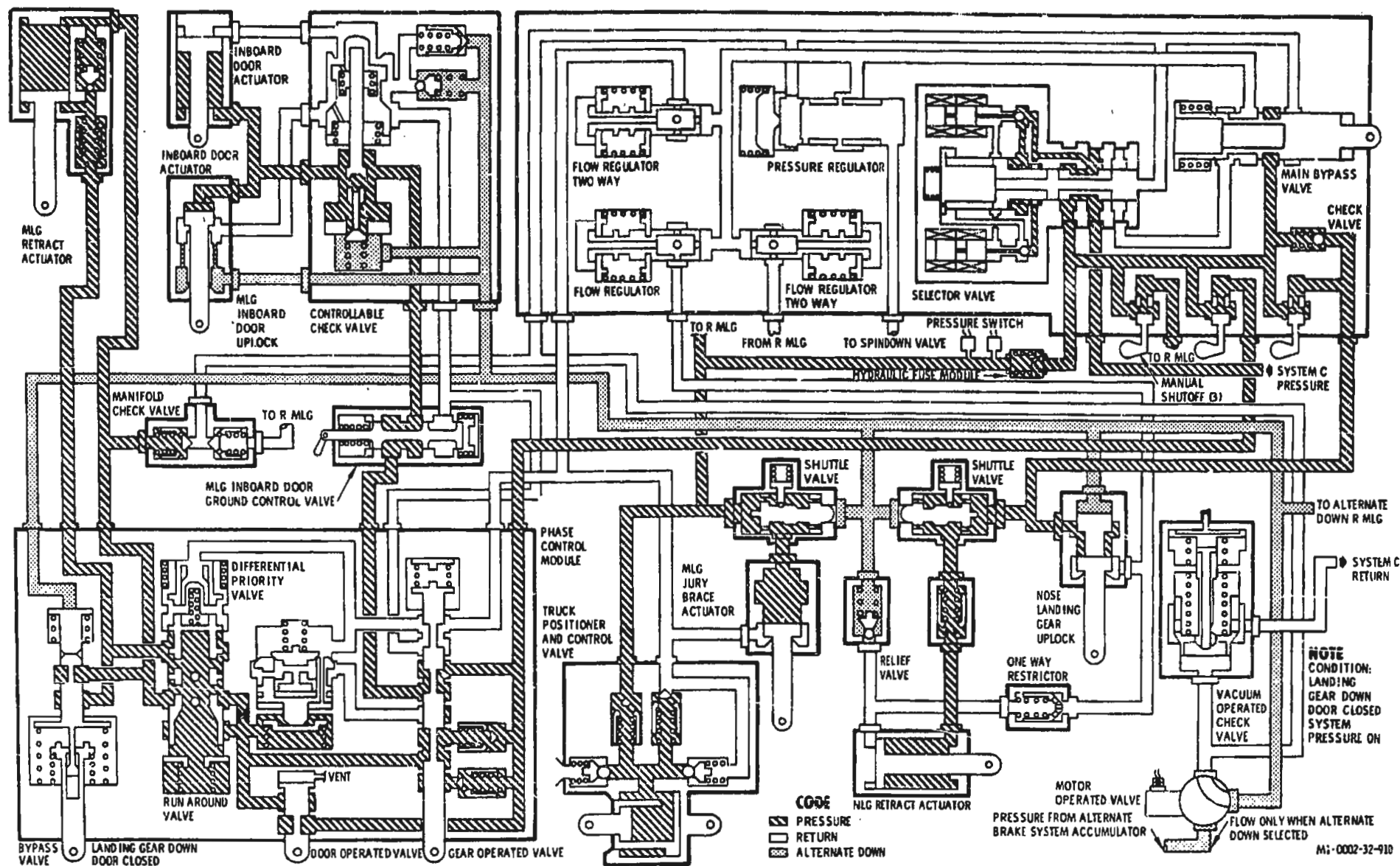


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Page 23 / 24
Sep 15 / 80

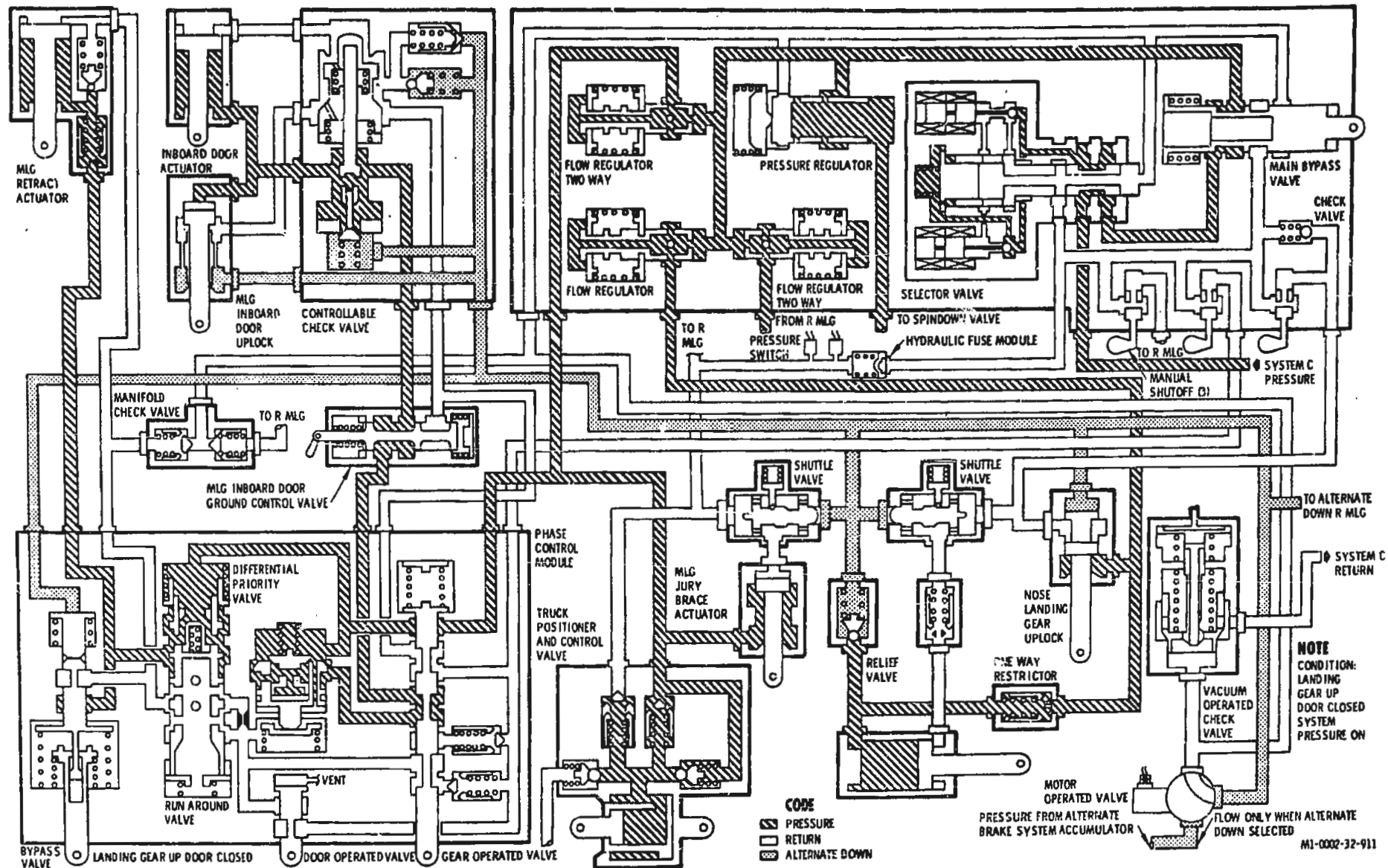
Page 23/24
Sep 15/80



Landing Gear Hydraulic Schematic
Figure 8 (Sheet 1)

EFFECTIVITY: 001-031 WITH S829-065 AND 032-999

32-00-00
Page 25/26
Aug 15/81

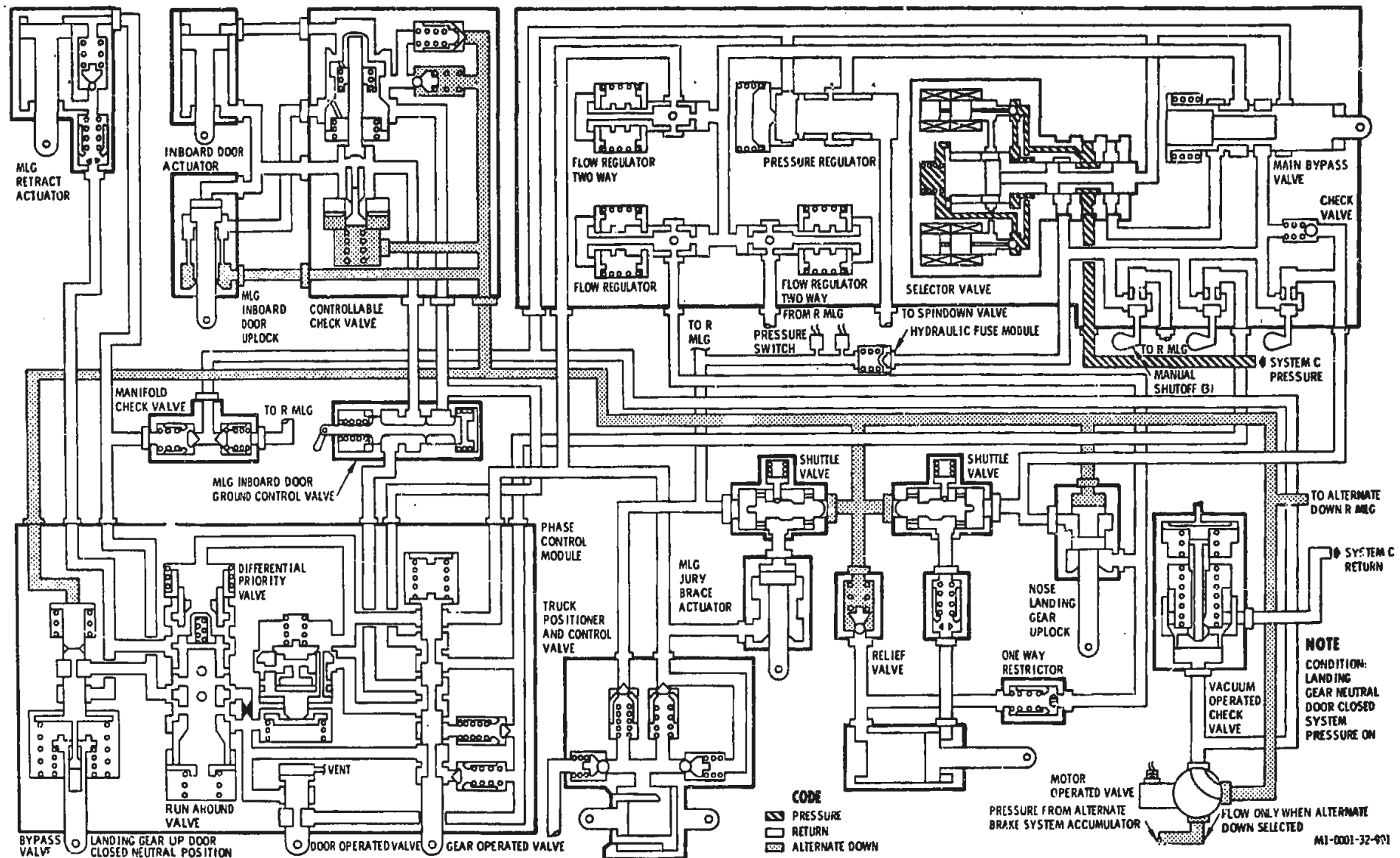


Landing Gear Hydraulic Schematic
Figure 8 (Sheet 2)

EFFECTIVITY: 001-031 WITH S629-065 AND 032-999

32-00-00
Page 27/28
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



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Landing Gear Hydraulic Schematic
Figure 8 (Sheet 3)

EFFECTIVITY: 001-031 WITH SB29-065 AND 032-999

32-00-00
Page 29/30
Aug 15/81

001B

LANDING GEAR - MAINTENANCE PRACTICES**1. General**

This procedure contains instructions to pin and safety the landing gear in a down-and-locked condition for gear-down revenue flight.

2. Equipment and Materials

Landing Gear Downlock Safety Pins, PN 1302300, or equivalent
Lock-wire, Fed Spec QQ-W-390, Temp A, 0.040-inch diameter, or equivalent

3. Referenced Procedure

10-10-00 Parking - Maintenance Practices

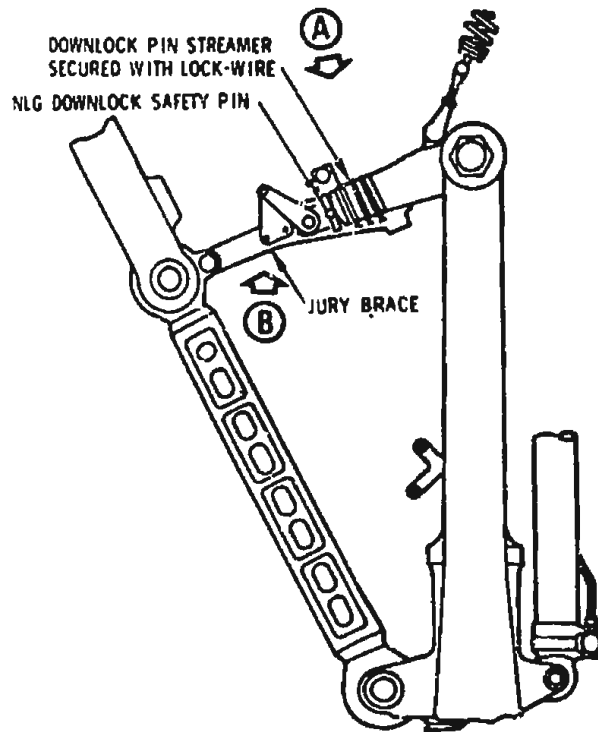
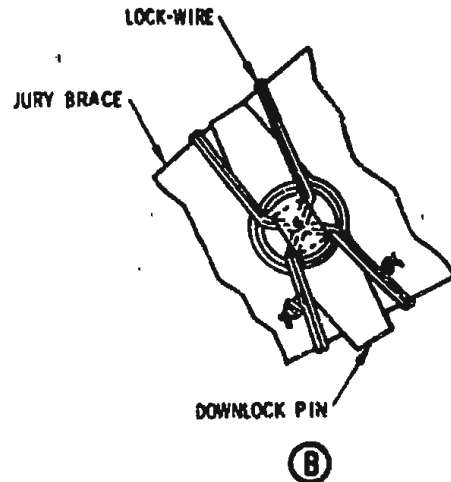
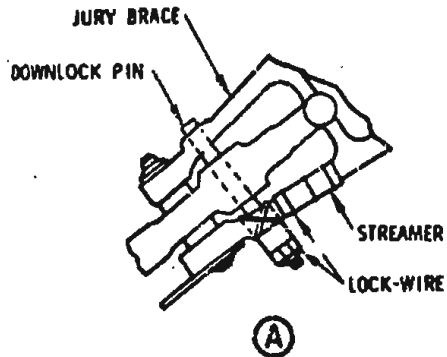
4. Maintenance Practices**A. Nose Landing Gear**

- (1) Install NLG downlock safety pin (Ref. 10-10-00).
- (2) Using lock-wire, secure downlock safety pin to jury brace (Ref. Fig. 201).
- (3) Wrap safety pin streamer around jury brace side which is adjacent to pin head.
- (4) Secure streamer with double wrapped lock-wire in three places.

B. Main Landing Gear

- (1) Install both MLG downlock safety pins (Ref. 10-10-00).
- (2) Using lock-wire, secure downlock safety pin to jury brace (Ref. Fig. 202).
- (3) Wrap safety pin streamer around jury brace.
- (4) Secure streamer with double wrapped lock-wire in three places.

LOCKHEED
MAINTENANCE MANUAL



NOSE LANDING GEAR ASSEMBLY
(VIEW LOOKING INBOARD FROM LH SIDE)

MI-0100-32-510

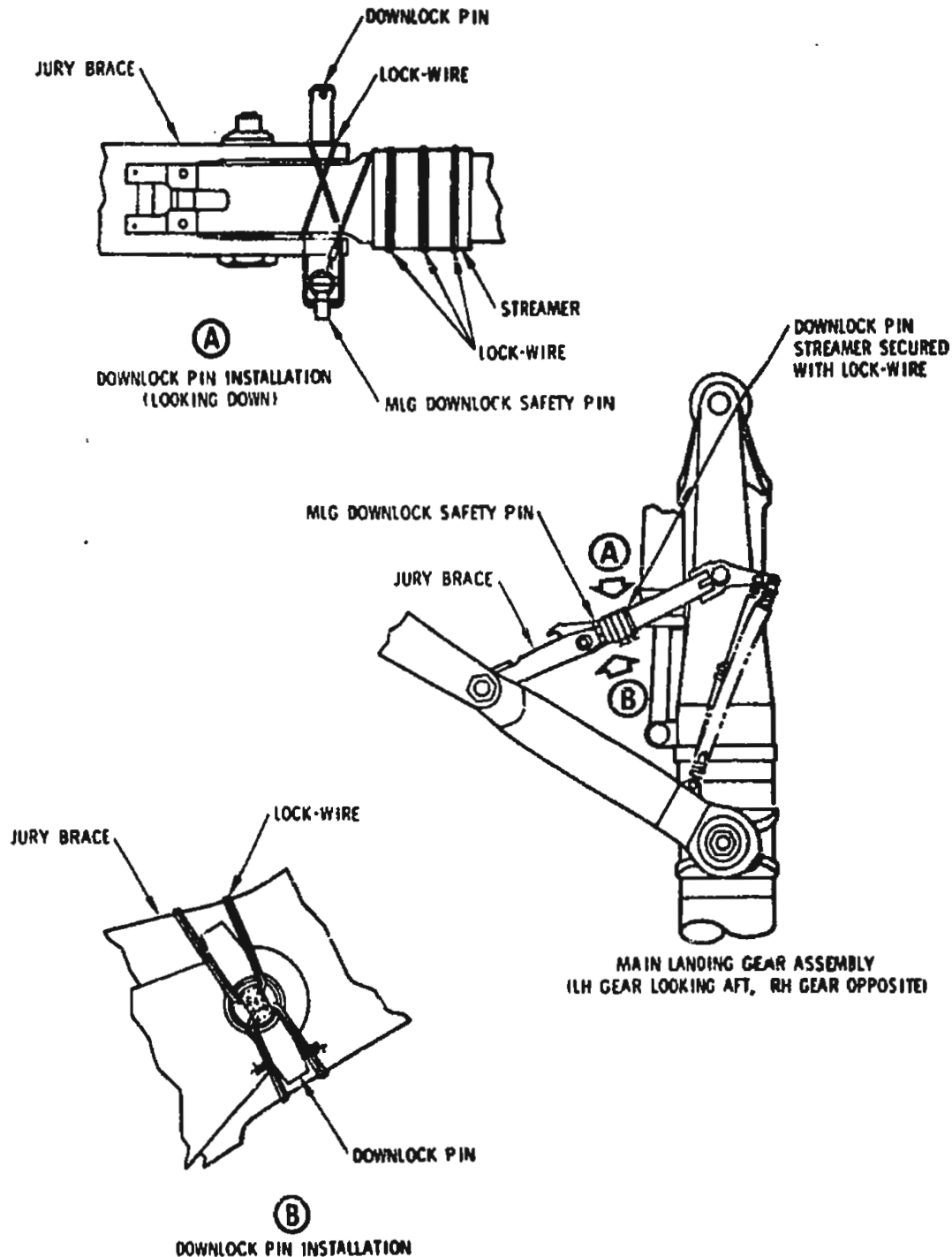
Nose Landing Gear Downlock Safety Pin Securing
Figure 201

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EFFECTIVITY: ALL

32-00-00
Page 202
Aug 15/82

LOCKHEED
MAINTENANCE MANUAL



M1-0100-12-511

Main Landing Gear Downlock Safety Pin Securing
Figure 202

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32-00-00
Page 203/204
Aug 15/82

MAIN LANDING GEAR AND DOORS - DESCRIPTION AND OPERATION**1. General**

The main landing gears (MLG) are two of three major assemblies that absorb landing loads and support the aircraft while on the ground. Landing loads are absorbed by conventional air and nitrogen, oil-type shock struts. A nonswiveling truck and axle assembly on each shock strut accommodates unlevel runway conditions and distributes the aircraft weight and the loads applied by the shock strut. Aircraft weight is distributed on the runway through four wheels and tires on each truck. Each MLG wheel well and strut recess area is equipped with one inboard and two outboard doors that completely enclose the landing gear in the retracted position (Ref. Fig. 1). The inboard doors (Ref. Fig. 2 and 3) are hydraulically operated and are mechanically sequence-controlled by phase control valves. One outboard (fixed) door (Ref. Fig. 4) is attached to the strut. The other door is hinged to the wing (Ref. Fig. 5) and attached to the strut by two rods. The hinged door on each gear is mechanically operated by gear retraction action.

Main gear inboard doors can be opened from the ground for landing gear maintenance and servicing. Release of each door for servicing is controlled from a separate D-handle located in the fuselage forward and inboard of each main landing gear inboard door. The D-handles are connected through cables to the phase control bypass valve cartridge, manual ground control valve, and main landing gear door uplock (Ref. Fig. 6). Warning lights on the pilots center instrument panel, zone 210, and on the Flight Engineers/Second Officers console upper panel indicate when the left or right door is not closed and locked.

The MLG hydraulic system has individual manual shutoff valves located in the hydraulic service center, zone 147. The manual shutoff valves should not be used to prevent landing gear or door operation. These shutoff valves have been replaced with plugs.

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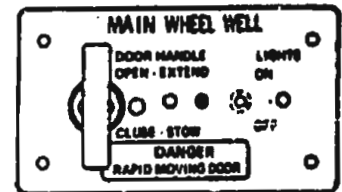
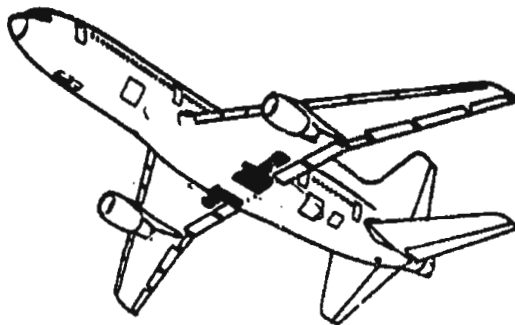
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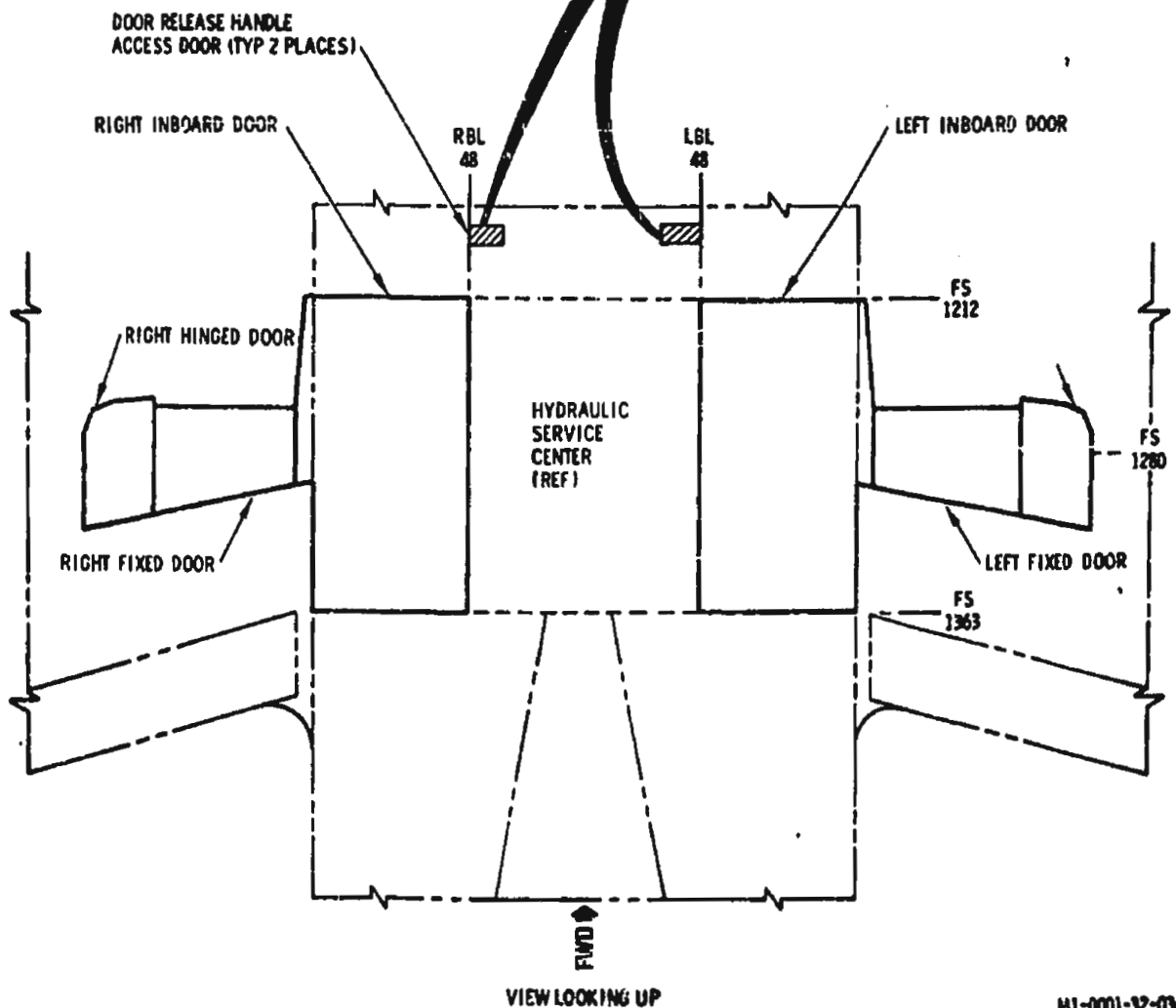
Page 1

Nov 15/84

LOCKHEED MAINTENANCE MANUAL



DOOR RELEASE HANDLE



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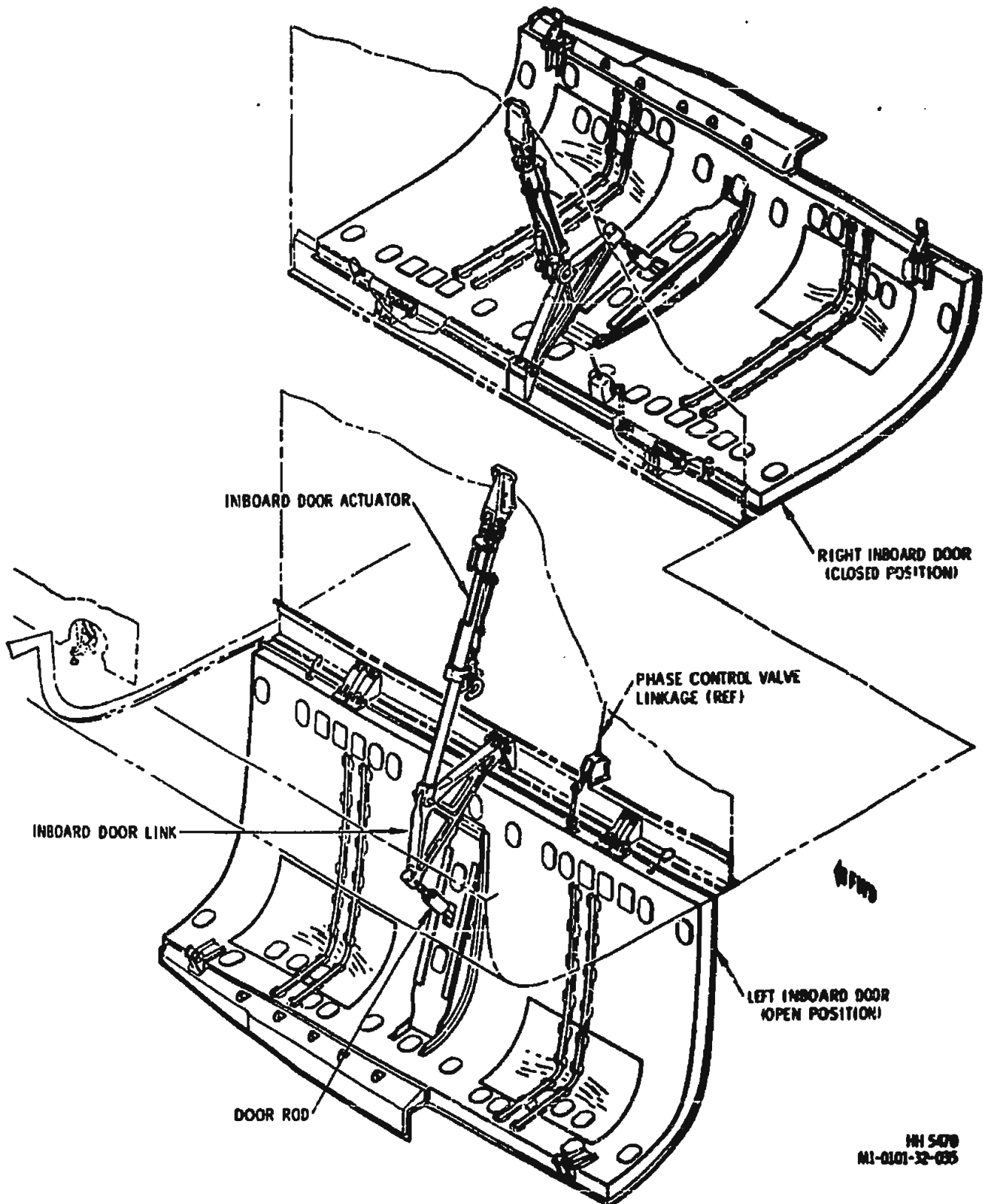
Main Landing Gear Doors
Figure 1

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Page 2
Jul 15/84

LOCKHEED
MAINTENANCE MANUAL



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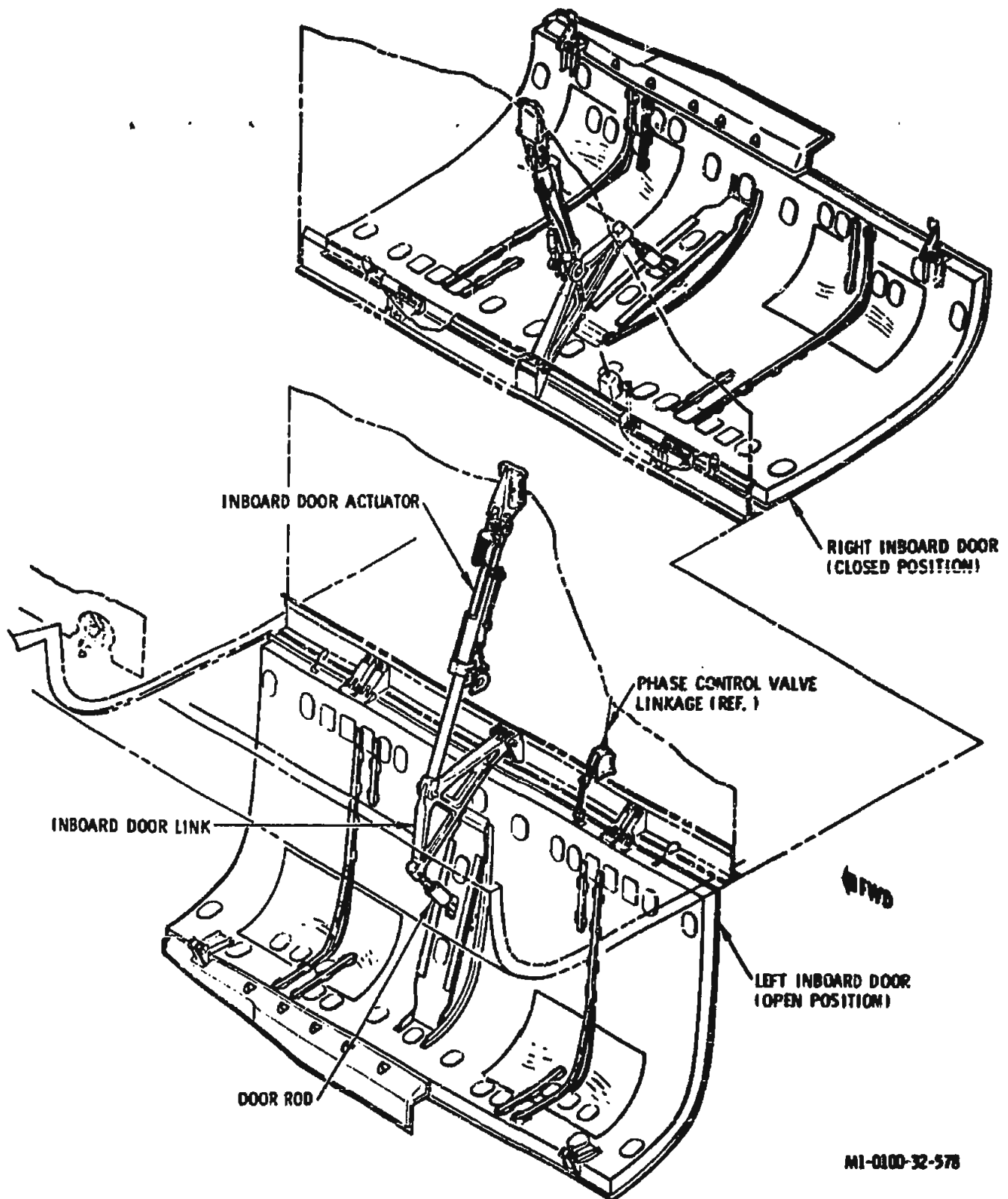
Main Landing Gear Inboard Door Installation
Figure 2 (Sheet 1)

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Page 3
Nov 15/76

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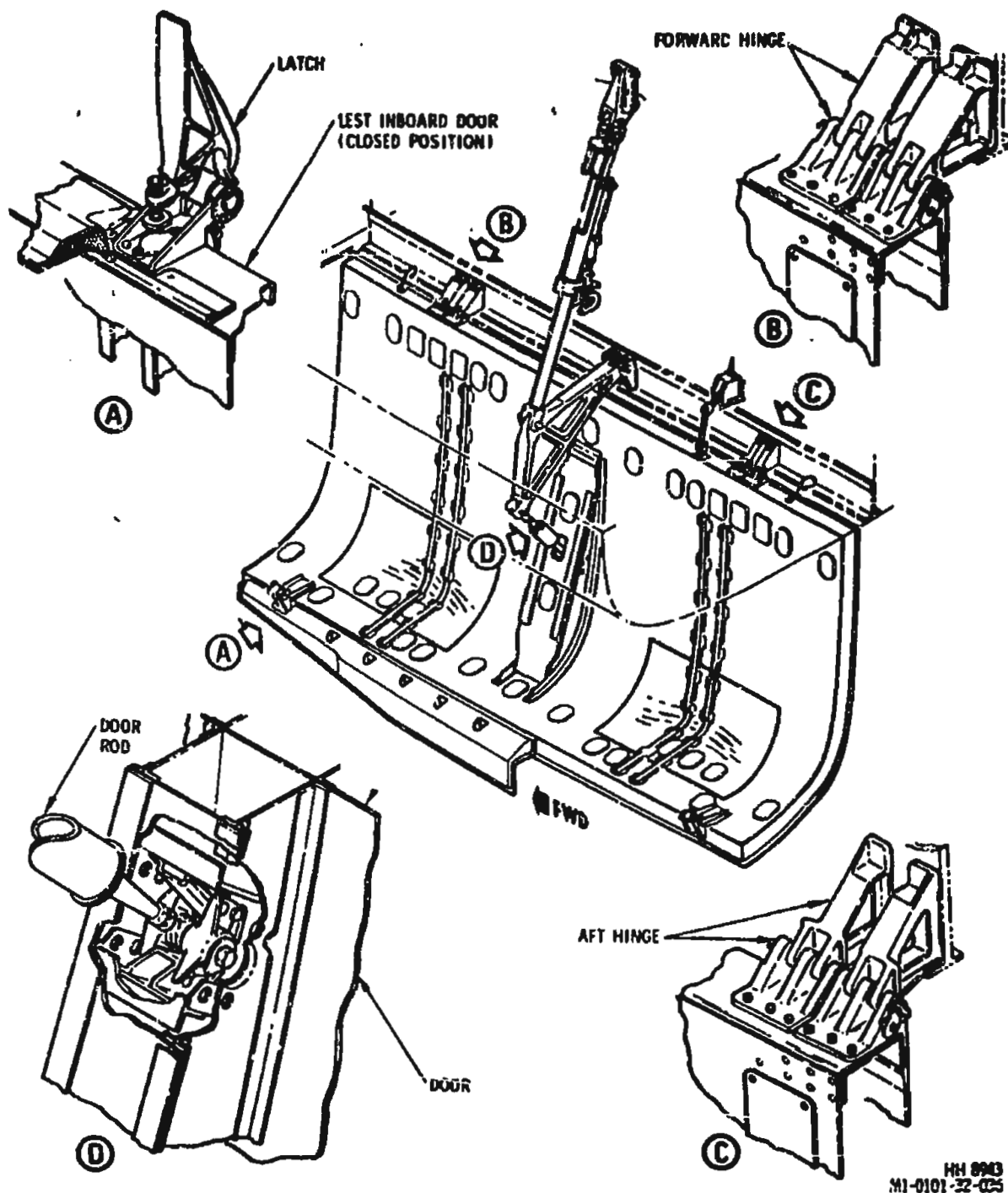
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MAINTENANCE MANUAL



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Main Landing Gear Inboard Door Installation
Figure 2 (Sheet 1)

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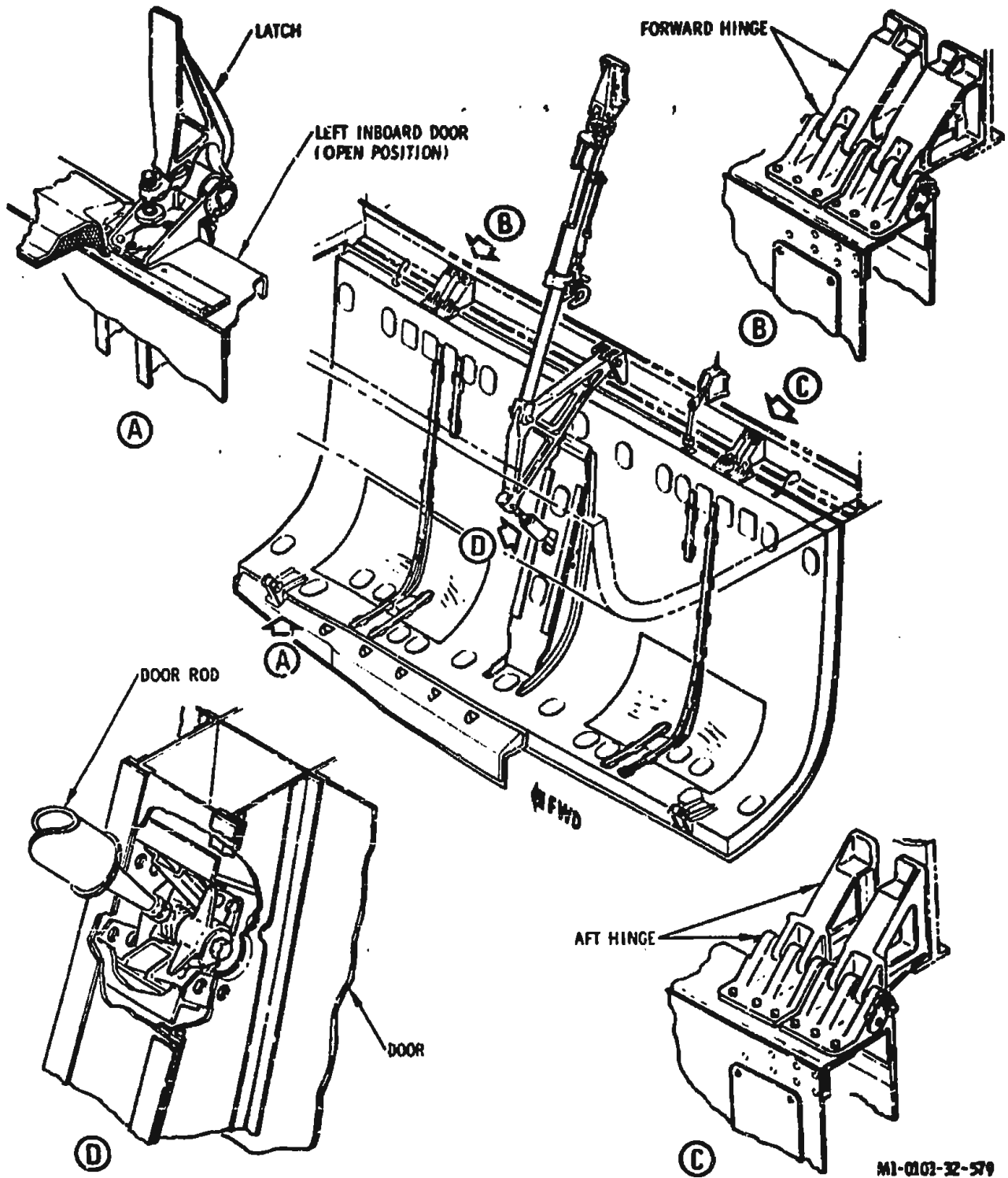
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Main Landing Gear Inboard Door Installation
Figure 2 (Sheet 2)

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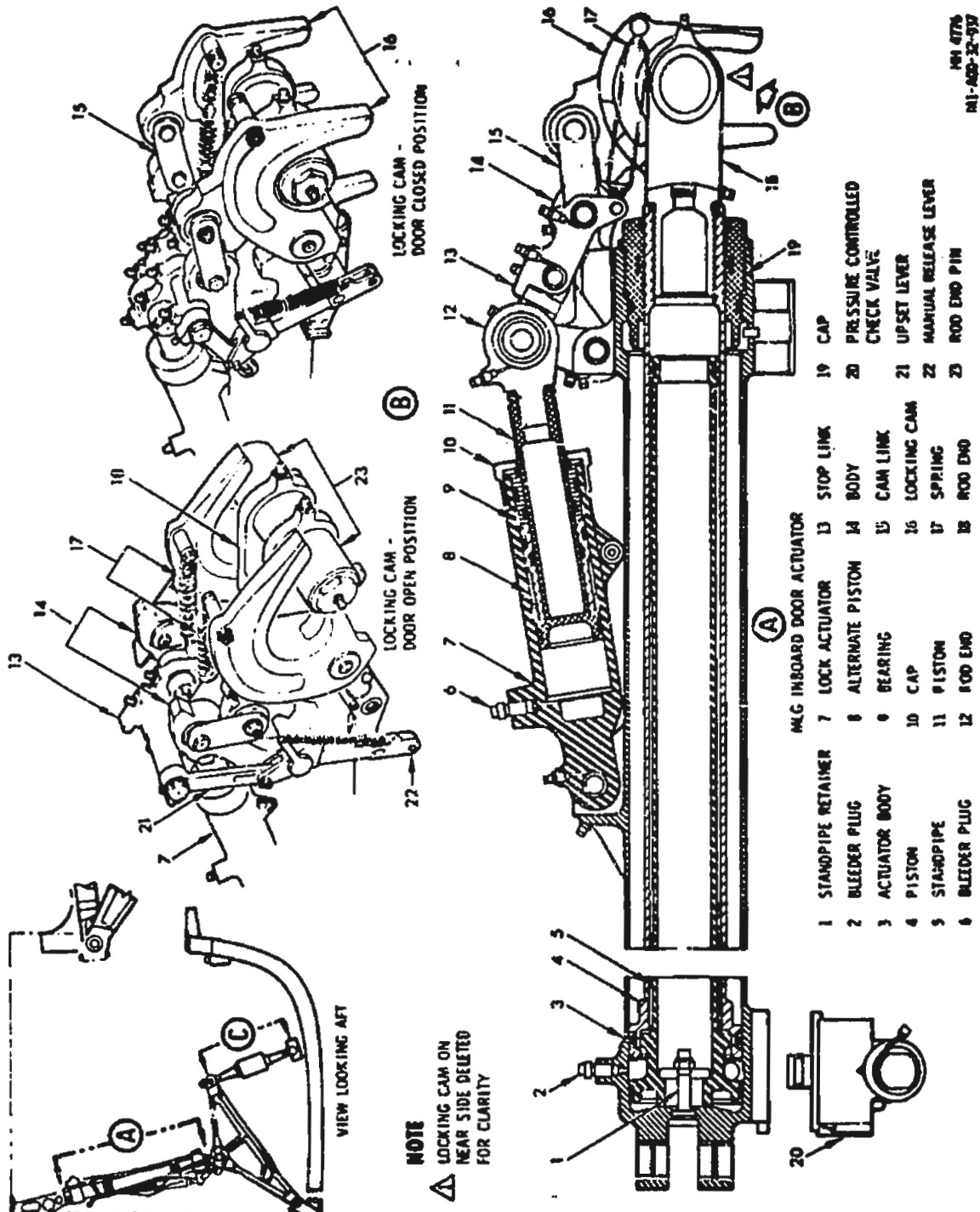
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Page 5
Nov 15/76

LOCKHEED
MAINTENANCE MANUAL



Main Landing Gear Inboard Door Installation
Figure 2 (Sheet 2)

LOCKHEED
MAINTENANCE MANUAL



Main Landing Gear Inboard Door Actuating Mechanism
Figure 3 (Sheet 1)

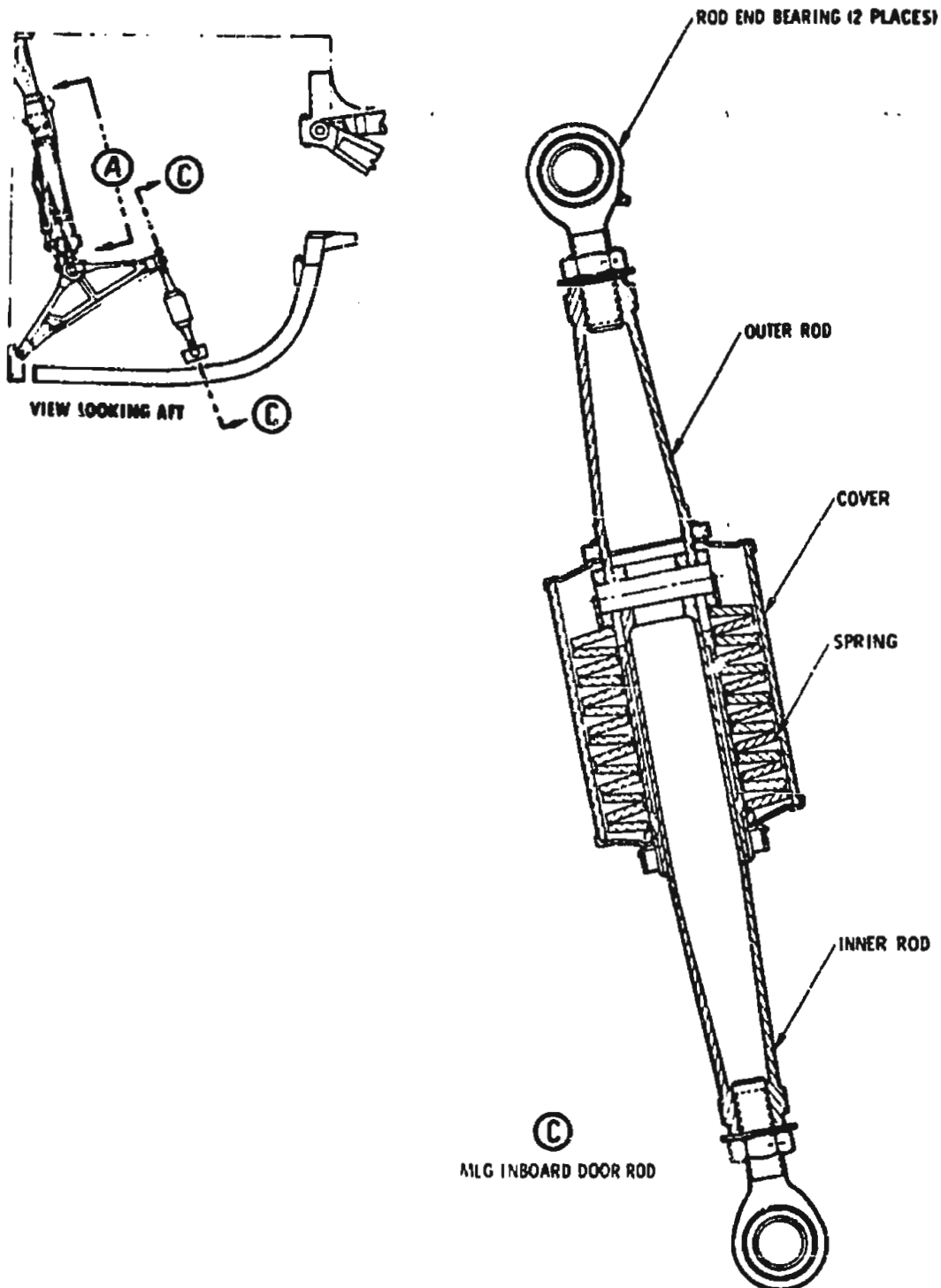
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Page 7

Feb 15/76

LOCKHEED
MAINTENANCE MANUAL



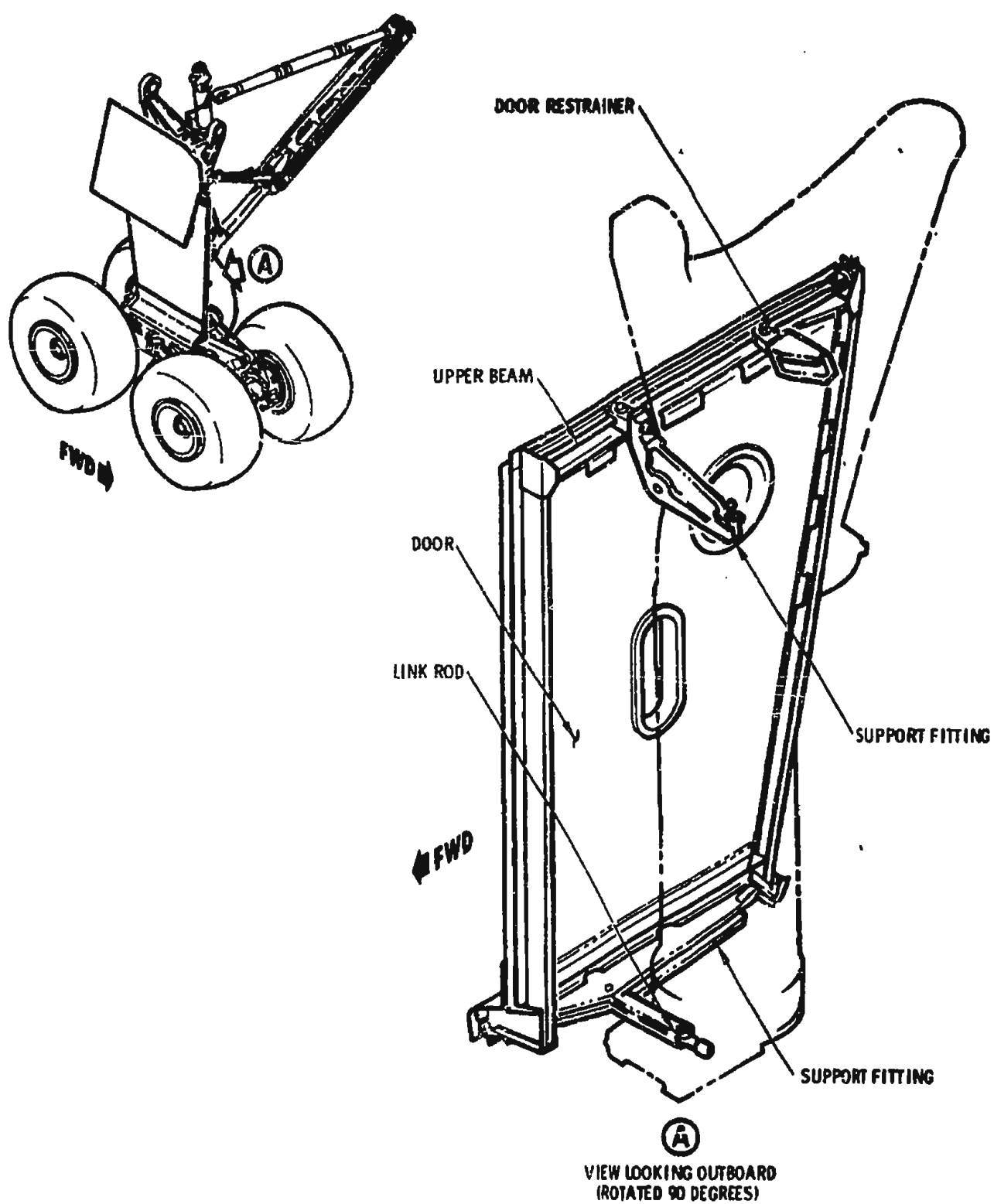
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Main Landing Gear Inboard Door Actuating Mechanism
Figure 3 (Sheet 2)

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32-10-00
Page 8
Feb 15/76

LOCKHEED
 MAINTENANCE MANUAL



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Main Landing Gear Fixed Door Installation
 Figure 4

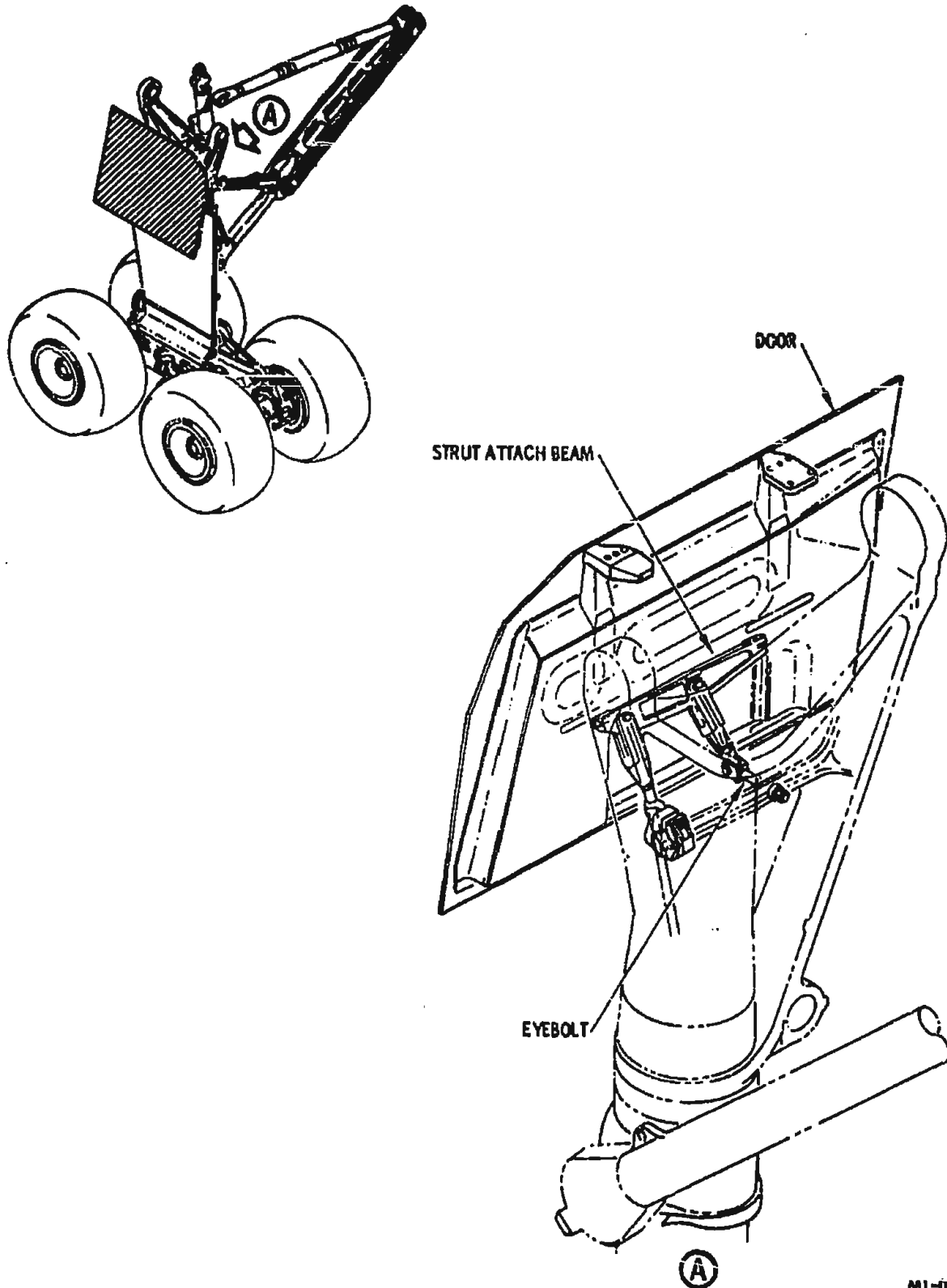
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 Page 9
 Jul 15/84

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MAINTENANCE MANUAL



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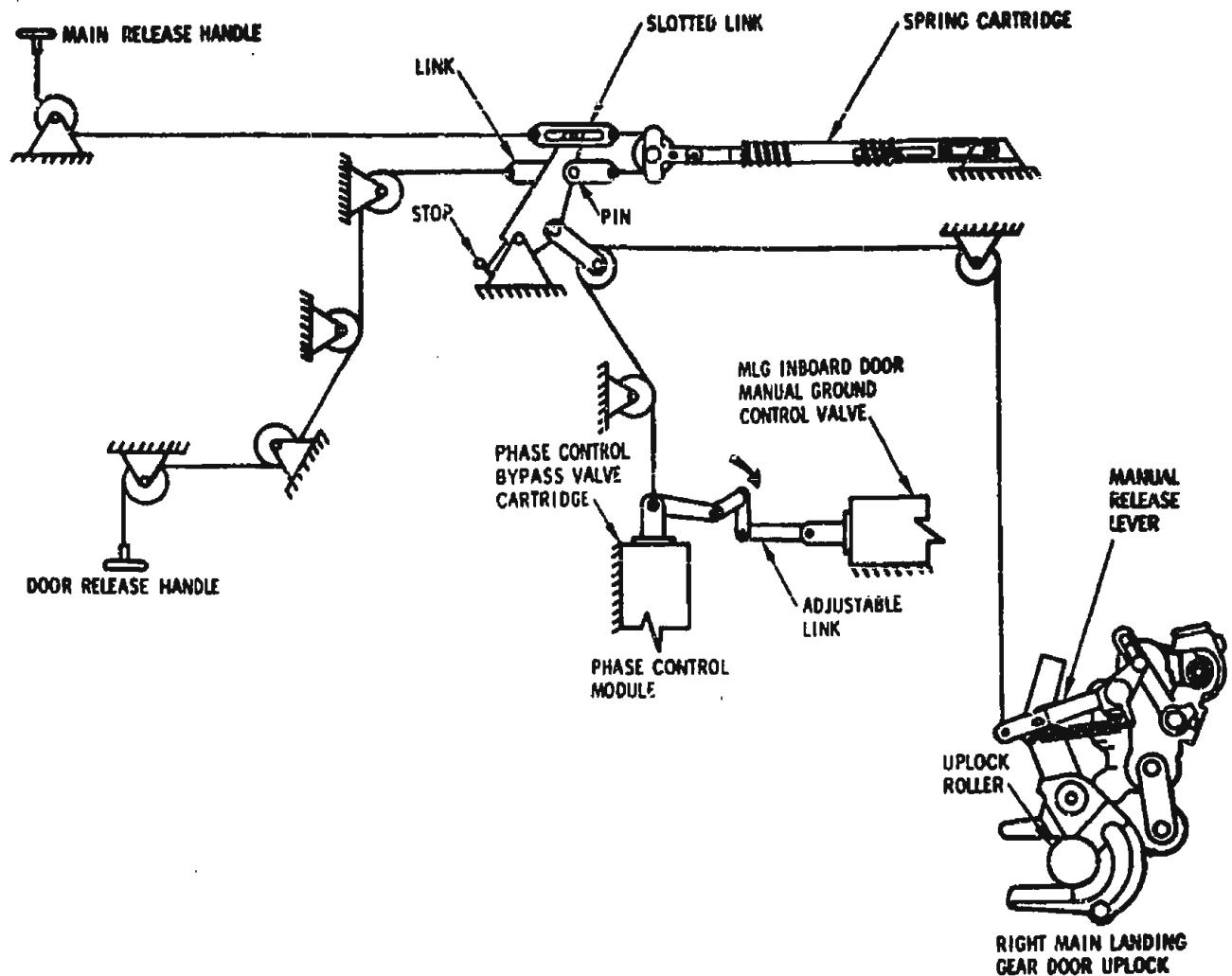
Main Landing Gear Hinged Door Installation
Figure 5

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32-10-00
Page 10
Jul 15/84

LOCKHEED
MAINTENANCE MANUAL



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Main Landing Gear Door Ground Operation System Schematic
Figure 6

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Page 11/12
Jul 15/84

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R MAIN LANDING GEAR AND DOORS - FAULT ISOLATIONR 1. General

R Reference data and fault isolation procedures for
R troubleshooting landing gear system faults are included in this
R section of the manual. A landing gear system malfunction
R detected by the flight crew is normally entered in the aircraft
R flight log book and reported to maintenance personnel by a firm
R fault code number. This number and the flight log book write-up
R can be found in the Chapter 32 Fault Code Index. The index
R specifies the maintenance manual section, fault isolation
R diagram figure number and block number indicating the diagram
R entry point containing the fault isolation procedure.

R Prerequisites listed at the top of each diagram identify
R mandatory preliminary steps and circuit breakers that must be
R closed before initiating any fault isolation step.

R 2. Fault Isolation

R Table 101 is list of fault isolation data in this section of the
R manual.

 Main Landing Gear and Doors Fault Isolation
 Table 101

FIGURE	TITLE
101	Component Location Index
102	Main Landing Gear Doors Locator Diagram
103	Main Landing Gear Doors Security Check

R EFFECTIVITY: ALL

0018

32-10-00
Page 101
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL

COMPONENT	QTY	AREA/ACCESS	REFERENCE
DOOR, MLG INBOARD	2	INBOARD OF MLG; 732A, 742A	32-12-01
DOOR, MLG FIXED	2	MLG STRUT; 734A, 744A	32-12-02
DOOR, MLG HINGED	2	MLG STRUT; 733A, 743A	32-12-03

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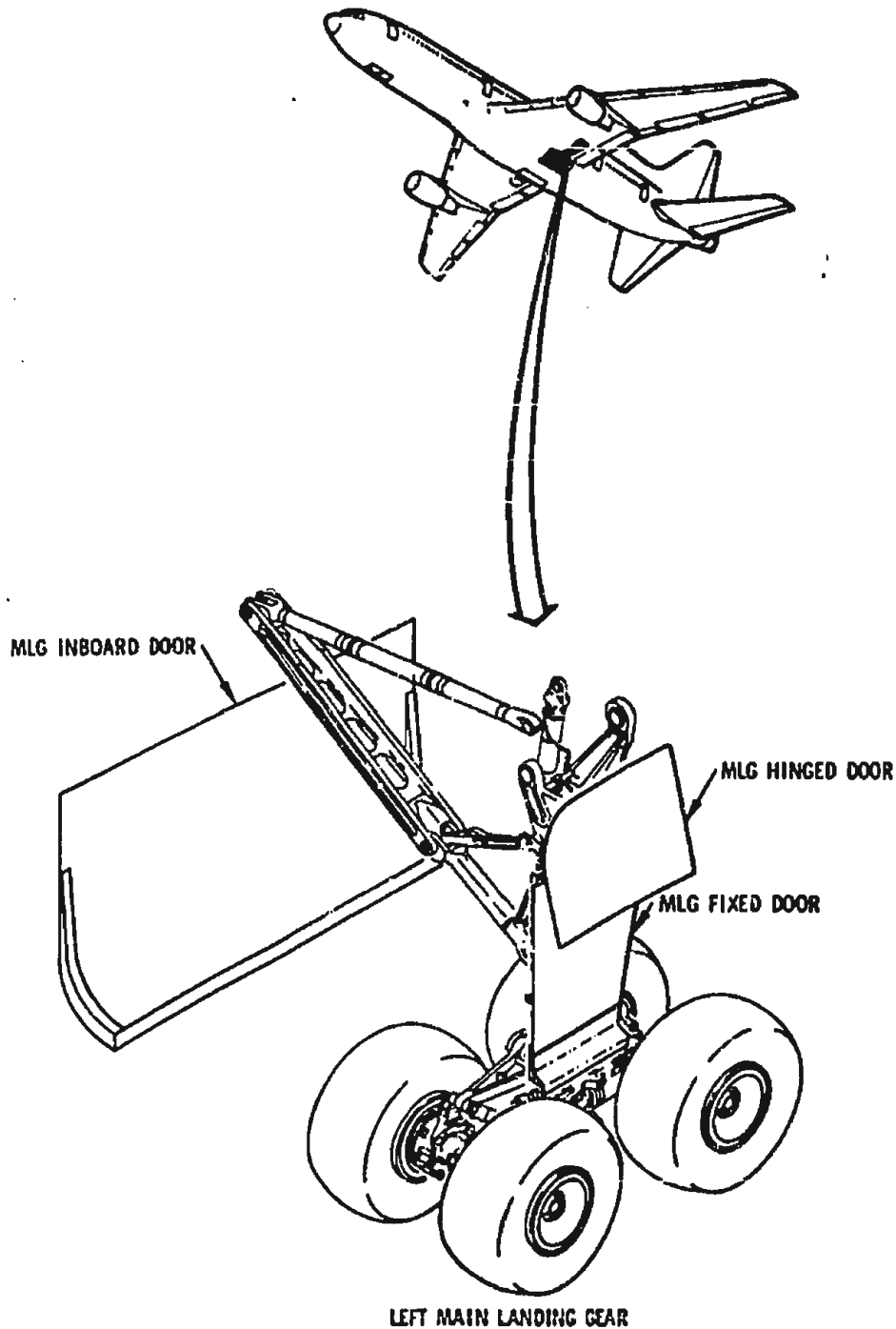
Component Location Index
Figure 101

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Page 102
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL



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Main Landing Gear Doors Locator Diagram
Figure 102

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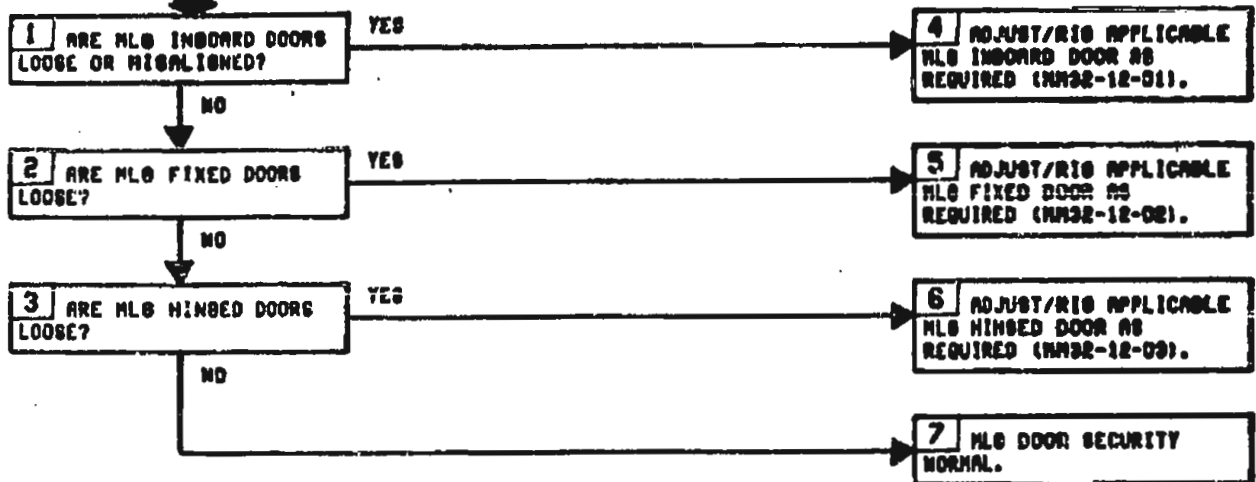
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Page 103
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL

PREREQUISITES

MLG AND MLG DOWNLOCK SAFETY PINS INSTALLED (MM32-10-10)
LANDING GEAR CONTROL LEVER DOWN AND TAGGED
MLG INBOARD DOORS CLOSED

MLG DOORS SECURITY CHECK



11-0000-24-777

Main Landing Gear Doors Security Check
Figure 103

EFFECTIVITY: ALL

32-10-00
Page 104
Nov 15/82

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MAINTENANCE MANUAL

MAIN_LANDING_GEAR_INBOARD_DOOR--MAINTENANCE_PRACTICES

1. General

R For maintenance practices containing instructions for opening
R the main landing gear inboard door using the manual release,
R refer to 32-33-00.

R 2. Referenced Procedure

R 32-33-00 Main Landing Gear Inboard Door - Maintenance
R Practices

**MAIN LANDING GEAR SYSTEM - DESCRIPTION AND OPERATION****1. General**

Each main landing gear (MLG) assembly consists of the following subassemblies (Ref. Fig. 1). All are common to a left or right installation.

Forward and aft MLG trunnion pins

MLG shock strut assembly

MLG truck and axle assembly

MLG truck attachment pin

MLG truck positioner

Four MLG brake links

Four MLG brakes

Four MLG wheels and tires

MLG upper and lower side braces

MLG jury brace assembly

MLG lateral brace.

Truck beam shield

MLG extend and retract actuator assembly (Ref. 32-32-00)

Upper and lower torque arms

The MLG assemblies are mounted to the MLG attachment rib structure in each wing and to structure in the fuselage wheel well. Each MLG shock strut assembly is attached to the airframe by the MLG forward and aft trunnion pins installed through arms integral with the MLG strut cylinder. The MLG shock strut is restrained in the vertical position by the MLG side brace when the landing gear is down and locked. The lateral brace transmits side loads from the strut back to the wing. Hydraulic power for retraction, extension, truck positioning, and brakes is distributed down the strut by tubing and hoses. All plumbing is manifolded and supported by brackets. Electrical wiring to support the MLG position and warning system and the brake temperature indicating system is distributed to junction boxes through shielding conduits. The MLG plumbing, electrical



R conduit, and fixed door installations are left hand and right
R hand peculiar and are not interchangeable.

2. Operation

During extension or retraction each MLG hinges about the forward and aft trunnion pins that are installed through the MLG cylinder trunnion arms. Retraction and extension is controlled from the flight station by either pilot through selective movement of the control switch lever. Movement of the control switch electrically positions the MLG hydraulic control valve to direct pressure to the retract and jury brace downlock actuators. Hydraulic pressure directed to the piston rod end (bottom) of the retract actuator retracts the piston rod which provides the force to retract the gear. Pressure directed to the actuator piston head end (top) extends the piston rod which provides the force to extend the gear.

During the gear-up cycle, hydraulic pressure is simultaneously applied to the bottom of the retract actuator and to the rod end of the jury brace downlock actuator. This pressure exerts force on the jury brace assembly, which compresses the downlock springs and provides rotation about the upper universal attachment pin.

Rotation about the universal attachment pin causes the jury brace assembly to fold, moving the jury brace pin upward. Folding of the jury brace produces folding of the side brace assembly, and permits the gear to swing into its up position in the wheel well.

During the gear-down cycle, hydraulic pressure is applied to the top of the retract actuator after the inboard door is opened. The actuator, assisted by gravity, pushes the gear down until the strut is vertical and the side brace and jury brace assemblies are fully unfolded. During the gear-down cycle, the jury brace downlock actuator is also pressurized, which extends the piston rod to ensure that the jury brace is locked in the fully unfolded position. The downlock springs are installed with a sufficient preload to hold the jury brace in the locked position whenever the hydraulic system is unpressurized.

When the MLG assembly is down and locked, the centerline of the pivot between the upper and lower side brace segments will be on the centerline passing through the side brace assembly upper attachment bolt and the side brace adapter (side-brace-to-strut attachment). When the jury brace is fully unfolded (gear down and locked), the centerline of the jury brace pin will be below the centerline passing through the center of the pivot between the upper and lower side brace segments and the center of the jury brace upper universal attachment pin.

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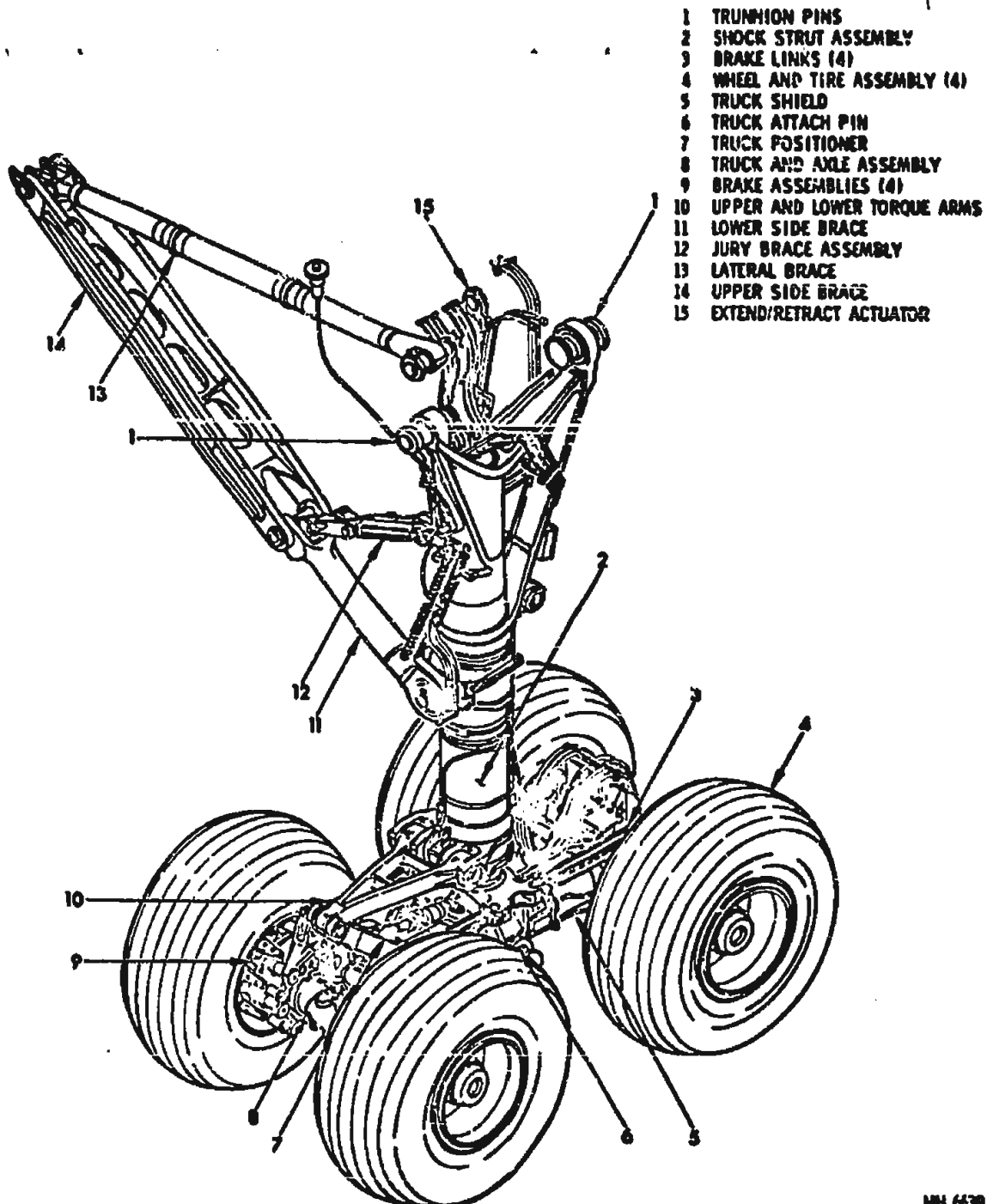
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Page 2
Aug 15/81

LOCKHEED



MAINTENANCE MANUAL



- 1 TRUNNION PINS
- 2 SHOCK STRUT ASSEMBLY
- 3 BRAKE LINKS (4)
- 4 WHEEL AND TIRE ASSEMBLY (4)
- 5 TRUCK SHIELD
- 6 TRUCK ATTACH PIN
- 7 TRUCK POSITIONER
- 8 TRUCK AND AXLE ASSEMBLY
- 9 BRAKE ASSEMBLIES (4)
- 10 UPPER AND LOWER TORQUE ARMS
- 11 LOWER SIDE BRACE
- 12 JURY BRACE ASSEMBLY
- 13 LATERAL BRACE
- 14 UPPER SIDE BRACE
- 15 EXTEND/RETRACT ACTUATOR

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Main Landing Gear Subassemblies
Figure 1

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Page 3

Feb 15/75



3. Main Landing Gear Shock Strut Assembly

A. Description

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The MLG shock strut (Ref. Fig. 2) is the primary support member of each MLG assembly. The shock strut is a conventional air or nitrogen oil type unit using compressed air or nitrogen to absorb shock and hydraulic fluid to dampen piston rebound. Major components of the shock strut assembly are: a cylinder assembly, a piston assembly, and upper and lower torque arms.

Each cylinder assembly contains the following parts:

A cylinder

An orifice support tube

An orifice diaphragm assembly

A rebound snubber assembly

A cover assembly

A filler tube

An air charging valve

The cylinder is a single-piece, forged and machined, heavy-walled steel tube with integral trunnion arms for airframe attachment. Integral lugs are provided to attach torque arms, side braces, jury brace assembly, and the extend and retract actuator.

The orifice support tube is installed against an internal flange at the top and is supported and guided at the bottom by steel rings that bear against the piston tube inner bore. The orifice diaphragm assembly is threaded into the lower end of the orifice support inside bore, and is locked with a flat tab lock held in place with lock-wired screws. The orifice support is sealed at the top by a seal contained in an annular groove. The top of the cylinder bore is closed with a cover assembly. The bottom end of the filler tube extends through the top of the orifice support and the upper end extends through the cover assembly. The bottom end of the filler tube is sealed at the orifice support by a seal contained in an annular groove. The upper end of the filler tube is locked to the cover assembly by two nuts. The air charging valve is located in the top of the filler tube.

The rebound snubber assembly is held against the lower end of the orifice support tube by the orifice diaphragm assembly.

EFFECTIVITY: ALL

001B

32-11-00

Page 4
Feb 15/74

LOCKHEED
MAINTENANCE MANUAL

The piston assembly is a one-piece, forged and machined steel tube with a large integral fork bored and bushed for attachment to the truck. Integral lugs provide for the attachment of brake links and torque arms. Upper and lower bearing assemblies also function as sealing devices and guides, locating the piston tube concentric with the cylinder and the orifice support tube. The piston is installed between the orifice tube and the inside cylinder wall. A diaphragm with an annular groove and a packing seal is installed against an internal flange near the center of the piston tube longitudinal axis. This diaphragm seals off the bore of the piston tube to reduce the total fluid volume required. A drain tube with an integral flange at the top extends down through the diaphragm, and projects through the cover assembly that closes the bottom of the piston tube bore. The drain tube has an annular groove and packing seal at the top, and is locked to the piston diaphragm by a retaining ring. The bottom end of the drain tube is splined to the cover assembly, and is locked in place with a nut. A drain plug installs into the bottom of the drain tube.

The piston upper bearing assembly is keyed to the piston tube, and is secured in place by a retaining ring at the top and at the bottom by the bearing extension. The bearing extension functions as a stop by contacting the spacer when the piston is fully extended. A snubber ring to control rebound forces is installed in an annular groove at the top of the bearing extension.

The piston lower bearing has annular grooves for two sets of spare seals to permit replacement of the active seals twice without complete landing gear disassembly.

The piston assembly is attached to the truck by the truck attachment pin.

B. Operation

Landing and taxi shocks are absorbed by upward movement of the piston assembly into the cylinder assembly. Upward movement forces fluid above the piston diaphragm to flow through the orifice, rebound snubber and holes in the orifice support tube, which increases the volume of fluid in the chamber above the orifice diaphragm and further compresses the volume of compressed air or nitrogen in the chamber to cushion the airframe from shock. When the piston assembly moves upward into the cylinder assembly, fluid also flows freely downward past the upper bearing extension, the snubber ring, and into the space between the piston tube and the cylinder wall. The snubber ring acts as a one-way restrictor valve. When the piston assembly moves downward, the snubber ring moves up against the top of the groove to

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32-11-00

Page 5
Dec 1/72

LOCKHEED
MAINTENANCE MANUAL

reduce the space between the bearing extension and the cylinder wall, which restricts upward fluid flow past the bearing extension to absorb piston rebound force. The rebound snubber inhibits fluid flow to reduce rebound.

4. Main Landing Gear Truck Assembly

A. Description

Each truck is a single-piece, forged and machined tubular beam that houses two axles. Each truck includes integral lugs for towing and attachment of brake links, a truck positioner, and the on-board weight and balance system transducers (Ref. Fig. 3). Bosses are provided on the upper surface for axle retaining pins and on the lower surface for jack pads. At each end, a large boss bored and fitted with flanged bushings provides sockets to accommodate the axles. A large boss located at the beam center is bored and bushed to accommodate the truck attachment pin.

5. Main Landing Gear Axle Assembly

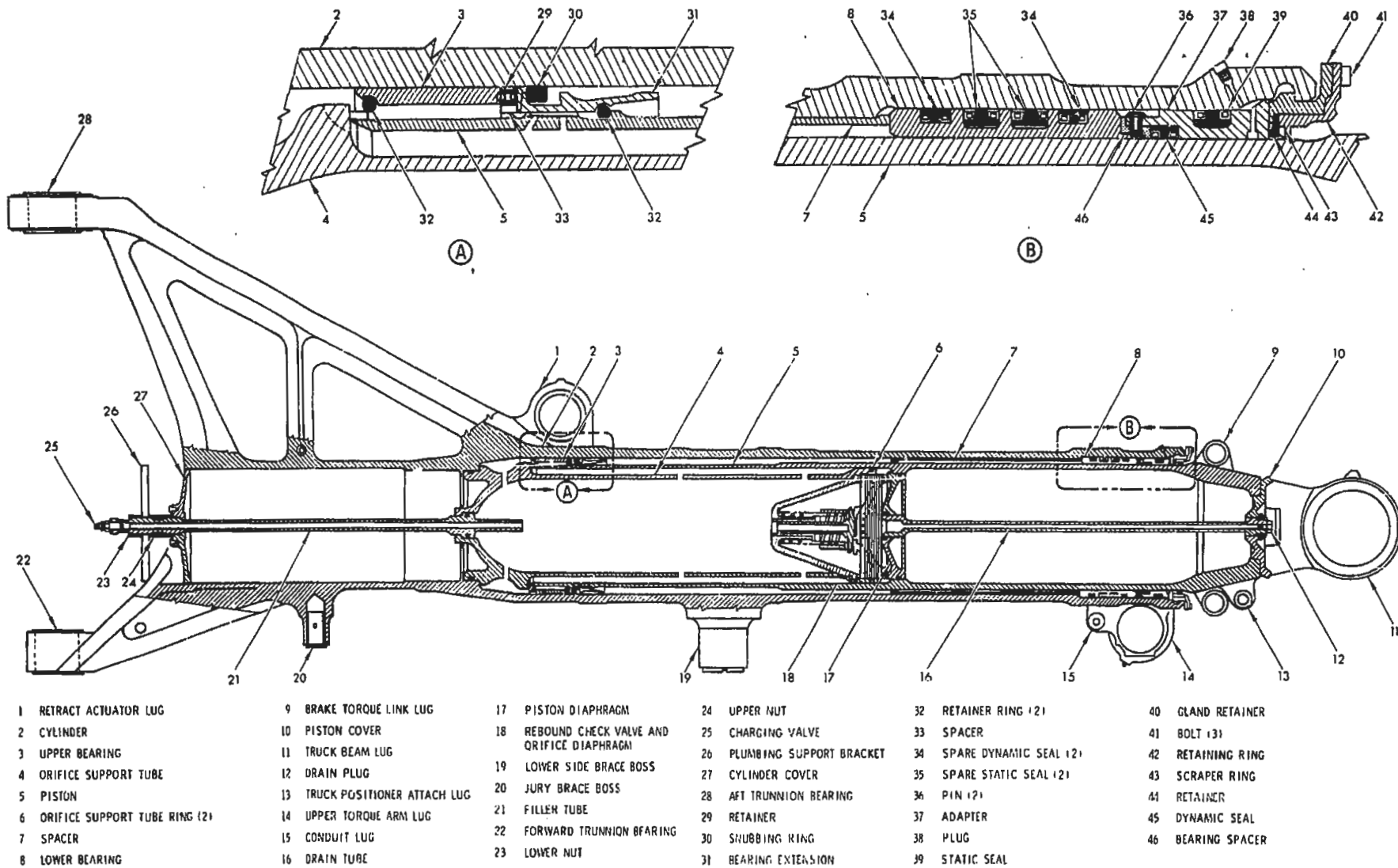
A. Description

Each MLG has two single-piece, forged and machined steel axles mounted in sockets incorporated in the truck (Ref. Fig. 3). Each tapered tubular axle supports two wheel and tire assemblies and two brake assemblies. Axles are internally threaded for wheel retaining nuts. All MLG axles are interchangeable. Each chrome-plated axle is secured in place by a hollow retaining pin.

6. Main Landing Gear Truck Attachment Pin

A. Description

The MLG truck attachment pin is a single-piece, machined tubular component that serves to join the MLG shock strut assembly and the truck assembly (Ref. Fig. 3). One end of the pin (outboard when installed) includes an integral flange with notches to accommodate a spanner during installation. The opposite end is serrated and threaded to accommodate a spacer and the truck attachment pin retaining nut. The MLG uplock snubber is installed in the bore of the truck attachment pin.

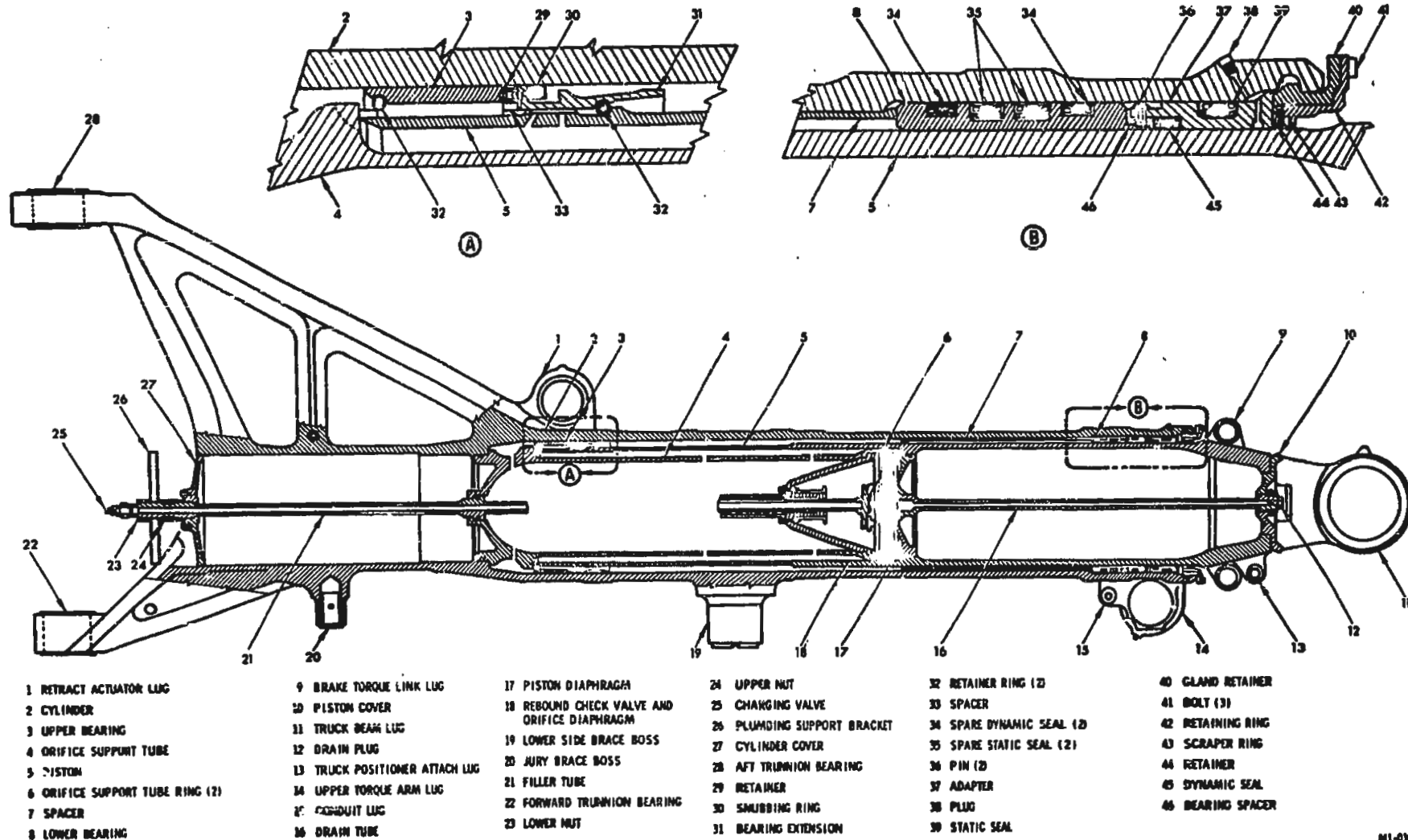


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Main Landing Gear Shock Strut
Figure 2

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Page 7/8
Aug 15/77

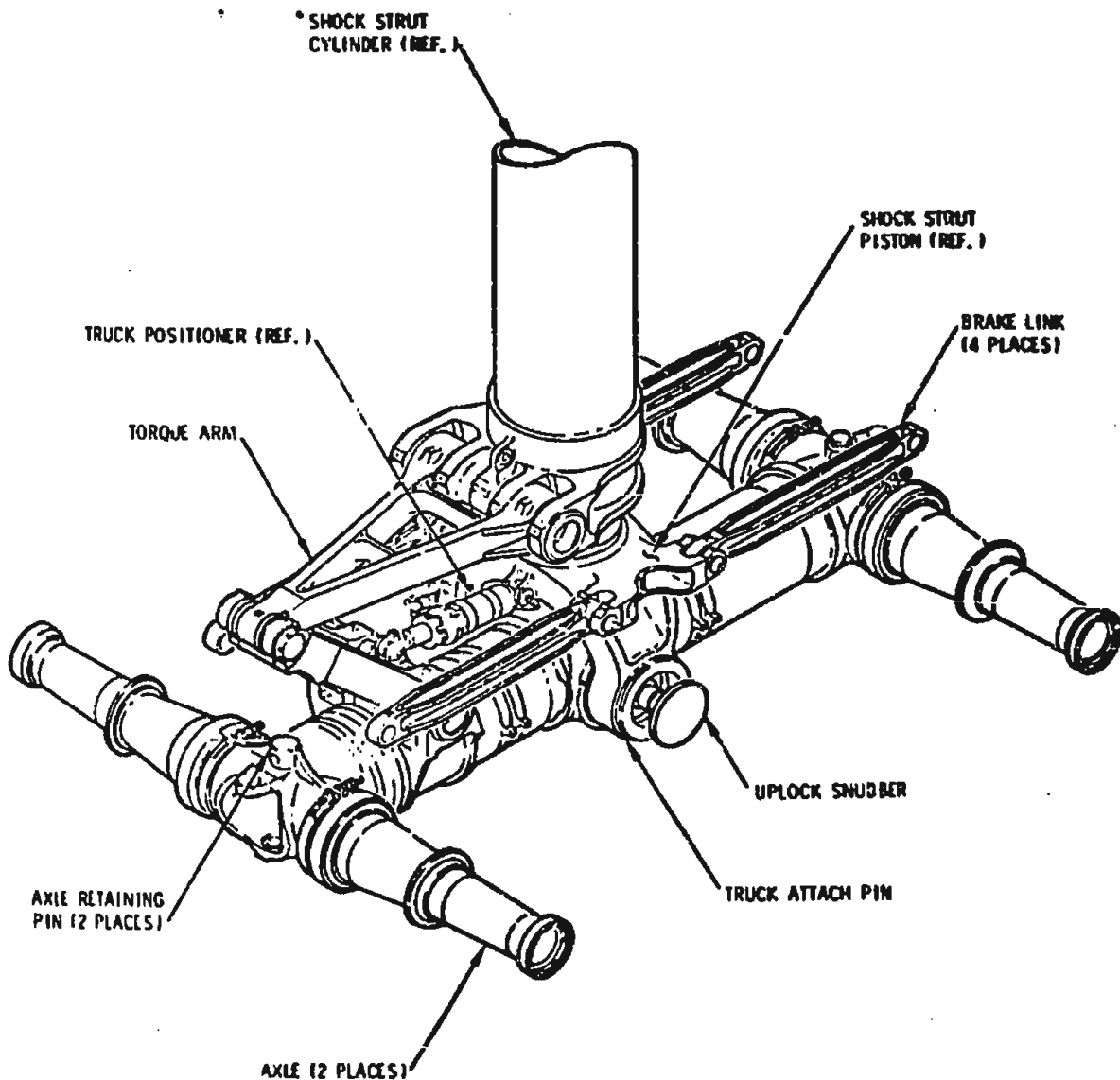


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Main Landing Gear Shock Strut
Figure 2

32-11-00
Page 9/10
Aug 15/77

LOCKHEED
MAINTENANCE MANUAL



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Truck and Axle Assembly
Figure 3

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32-11-00
Page 11
Aug 15/77

LOCKHEED
MAINTENANCE MANUAL

7. Main Landing Gear Uplock Snubber Assembly

A. Description

- R The MLG uplock snubber assembly is a single-acting, oil-filled (MIL-H-5606), spring-type shock absorber. The snubber is mounted in the outboard end of the MLG truck attachment pin (Ref. Fig. 3 and 4). When the MLG is retracted, the snubber is immediately above and in contact with a pad on the MLG inboard door link apex. The uplock snubber, assisted by the upstop snubber, modulates final nesting movement of the MLG after it is retracted; the uplock snubber also absorbs shocks that might otherwise be transmitted to the airframe by landing gear movement during severe down gusts in flight.

B. Operation

At the end of each retraction cycle, the MLG inboard door link contacts the pad on the uplock snubber, and the snubber becomes completely compressed by the weight of the gear. When the landing gear moves upward (away) from the pad on the inboard door link during a severe down gust, internal springs extend the snubber rapidly. When the landing gear moves downward back to its (normal) retracted position, compression of the internal springs and the flow of oil through a restricting orifice prevent shock by regulating landing gear movement; the snubber moves slowly into the pad without slamming.

8. Main Landing Gear Brake Link Assembly

A. Description

Each brake link assembly is a forged and machined titanium I-beam tapered to include an integral plain rod end bearing at each end (Ref. Fig. 3). Each brake link is installed between a pair of lugs at the bottom of the main landing gear strut piston and a pair of lugs on each brake piston housing assembly. The brake links, which are installed with a single bolt at each end, react to torque created by brake application. All brake links are interchangeable.

9. Main Landing Gear Upper and Lower Torque Arm Assemblies

A. Description

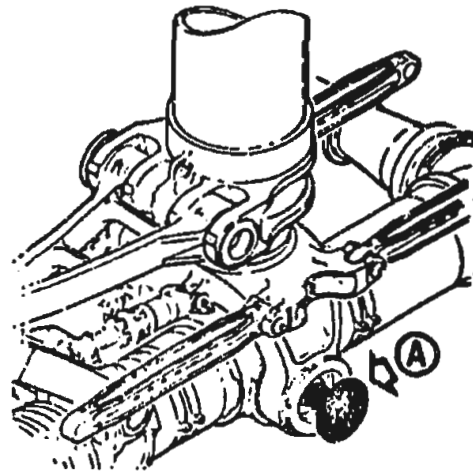
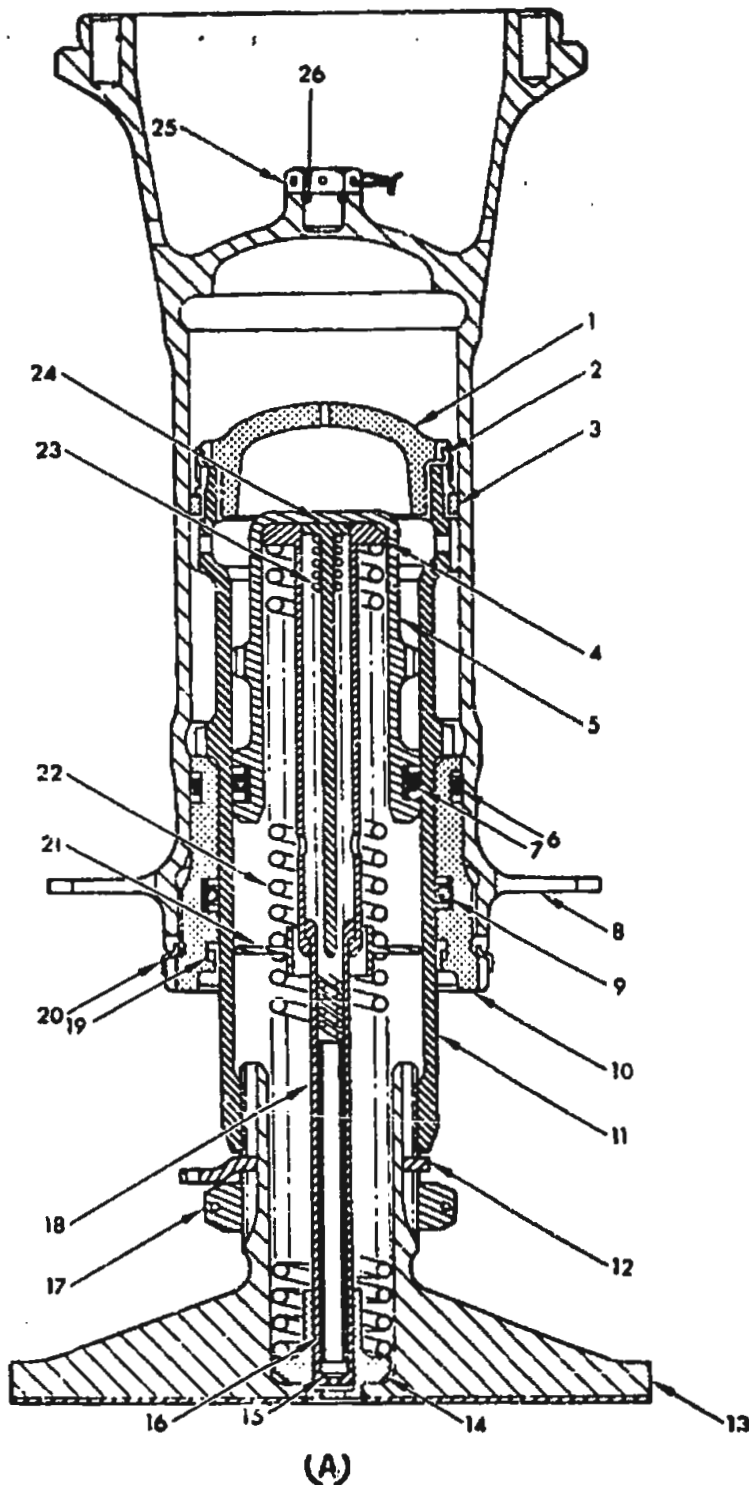
The MLG torque arms prevent rotation of the MLG strut piston and truck assembly without restricting normal up and down action of the strut and truck. The upper torque arm

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32-11-00
Page 12
Jun 15/79

LOCKHEED
MAINTENANCE MANUAL



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|----|---------------|----|--------------|
| 1 | ORIFICE | 14 | BUSHING |
| 2 | LOCK | 15 | FILTER DISC |
| 3 | PISTON RING | 16 | SPACER |
| 4 | SLEEVE | 17 | NUT |
| 5 | PISTON | 18 | PLUNGER |
| 6 | SEAL | 19 | EXCLUDER |
| 7 | SEAL | 20 | LOCK RING |
| 8 | CYLINDER | 21 | SPRING GUIDE |
| 9 | SEAL | 22 | SPRING |
| 10 | PACKING GLAND | 23 | SPRING |
| 11 | PISTON | 24 | SPRING GUIDE |
| 12 | LOCK WASHER | 25 | BLEEDER PLUG |
| 13 | PAD | 26 | PACKING |

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Main Landing Gear Uplock Snubber Assembly
Figure 4

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32-11-00
Page 13
Aug 15/77



assembly is mounted to integral lugs on the bottom and front of the MLG strut cylinder (Ref. Fig. 3). The lower torque arm is mounted to lugs on the upper surface of the truck.

R 10. Main Landing Gear Upstop Snubber Assembly

A. Description

The MLG upstop snubber (Ref. Fig. 3 and 5) is a single-acting, oil-filled (MIL-H-5606), spring-type shock absorber. The snubber is mounted in the inboard end of the upper torque arm pin. When the MLG is retracted, the snubber is immediately below the lateral brace and in contact with a striker pad attached to the lateral brace. The upstop snubber decelerates the upward motion of the MLG at the end of each retraction cycle. The snubber absorbs shocks that would be otherwise transmitted to the airframe by the landing gear. The upstop snubber also assists the uplock snubber to modulate final upward travel of the MLG during severe down gusts in flight.

B. Operation

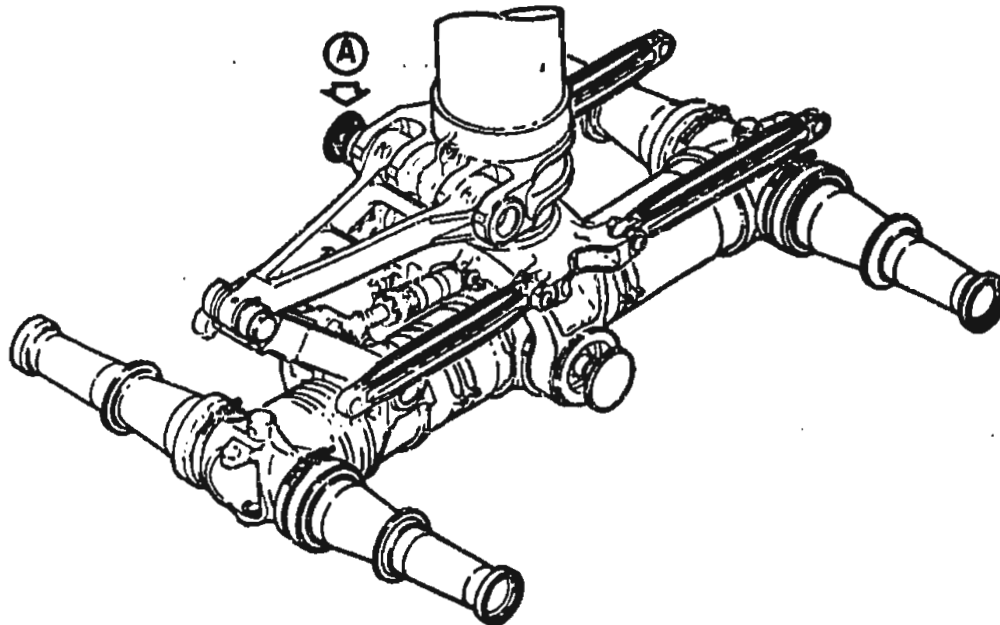
At the end of each retraction cycle, the pad on the snubber contacts the pad on the lateral brace, and the internal springs compress and decelerate the upward movement of the landing gear. During compression of the snubber, oil is forced to flow through an orifice made variable in size by a metering pin to further aid the upward deceleration. When the landing gear moves back downward to its (normal) retracted position, the oil flow is reversed through the orifice to dampen the rebound force of the springs.

11. Main Landing Gear Upper and Lower Side Brace Assemblies

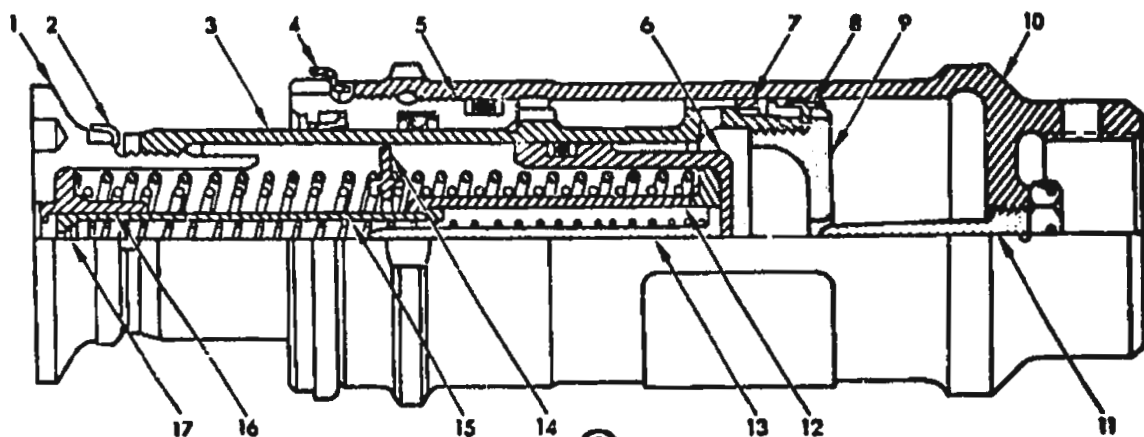
A. Description

The MLG upper and lower side brace assemblies (Ref. Fig. 6) are two individual segments pinned at a common pivot point. The upper and lower side braces form a single, foldable assembly which provides the major means for vertical restraint of the MLG strut assembly when locked down. The upper and lower side braces are each single-piece components forged and machined from aluminum alloy. The upper and lower side brace assemblies fold at their common pivot point when the gear retracts.

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MAINTENANCE MANUAL



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|---|--------------|----|-------------|
| 1 | PAD | 10 | CYLINDER |
| 2 | LOCKRING | 11 | PIN |
| 3 | PISTON | 12 | SLEEVE |
| 4 | LOCKRING | 13 | GUIDE |
| 5 | BEARING | 14 | GUIDE |
| 6 | PISTON | 15 | GUIDE |
| 7 | RING | 16 | BUSHING |
| 8 | ORIFICE LOCK | 17 | FILTER DISC |
| 9 | ORIFICE | | |



(A)
CROSS SECTION

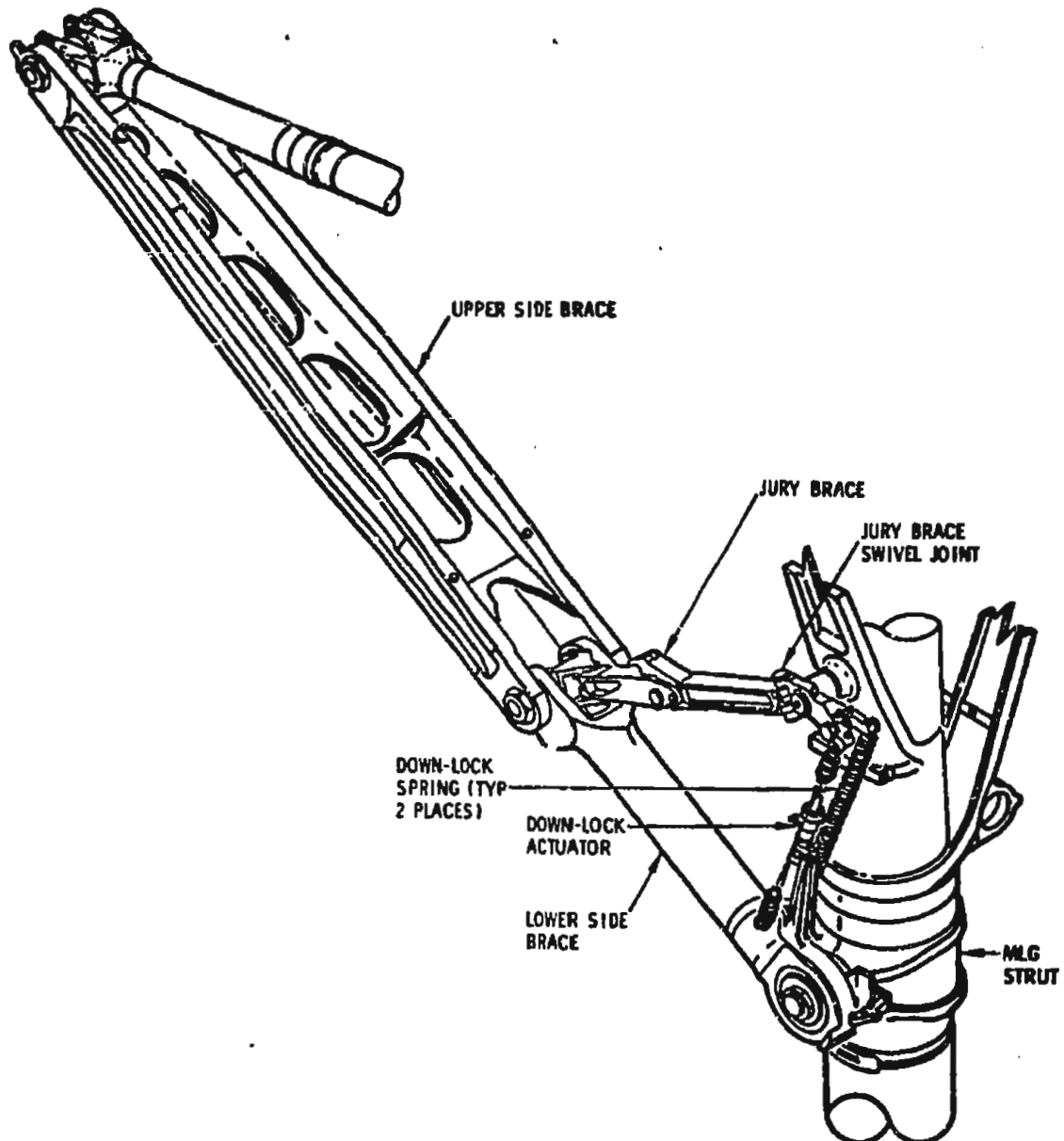
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Main Landing Gear Upstop Snubber Assembly
Figure 5

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32-11-00
Page 15
Aug 15/77

LOCKHEED
MAINTENANCE MANUAL



121 5571
M1-0100-32-151

Side Brace and Jury Brace Assemblies
Figure 6

R
R
001B EFFECTIVITY: ALL

32-11-00
Page 16
Aug 15/77

LOCKHEED
MAINTENANCE MANUAL

12. Main Landing Gear Upper and Lower Jury Brace Assemblies

A. Description

The jury brace assembly (Ref. Fig. 6) is a four-segment folding brace installed between the MLG shock strut and the pivot joining the upper and lower side braces. The four segments are: lower universal, lower jury brace, upper jury brace, and upper universal. All segments are machined from aluminum alloy forgings. The upper and lower components are joined by a pin that becomes the pivot as the jury brace folds during gear movement. The lower universal is attached to the side brace assembly by the upper and lower side brace pivot bolt. The upper universal is installed on and pivots around a pin mounted on a protruding boss integral with the MLG cylinder. The jury brace actuator, which is connected to the upper universal, provides downlock capability.

B. Operation

When the gear is down and locked, the jury brace components assume a position that places the centerline of the jury brace pivot bolt slightly below a straight line drawn through the centers of the side brace pivot bolt and the upper universal pivot bolt. Two compression springs push upward on the upper universal and apply a force to maintain the jury brace slightly over center and locked. Matching holes are provided in the upper and lower jury brace segments to install a ground lock safety pin. When the gear is retracted, the jury brace downlock actuating cylinder pulls down on the universal, which causes the jury brace pivot bolt to move upward, to permit the side brace assembly to fold and the landing gear to retract.

R

R 13. Truck Beam Shield

R A. Description

R The truck beam shield is a single-piece, press-formed
R aluminum alloy sheet metal element. The shield is mounted
R below the truck beam to protect the high tensile strength
R steel beam from rocks and debris during ground operations.

EFFECTIVITY: ALL

001B

32-11-00
Page 17/18
May 15/85

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR ASSEMBLY - ADJUSTMENT AND TEST

1. General

R The following procedure checks MLG truck alignment and adjusts
R toe-in by moving spacers from one side of the torque arm apex to
R the opposite side (Ref. Fig. 501). This procedure is applicable
only to MLG which incorporate six (rather than two) spacers in
the torque arm apex (Ref. SB 32-087). Alignment and adjustment
is usually not required unless MLG tires show excessive or
unusual wear patterns.

2. Equipment and Materials

Measuring tape, steel, 100-foot length

Alignment and Symmetry Kit, Lockheed Part No. BG02 (1304765), or
equivalent

R Grease, Ref. MM 12-20-00, Lubrication, Scheduled Servicing

3. Referenced Procedures

7-11-00 Wing and Fuselage Jacking - Maintenance Practices

8-11-00 Leveling, Plumb Bob - Maintenance Practices

8-12-00 Leveling, Spirit Level - Maintenance Practices

8-13-00 Leveling, Engineers Transit - Maintenance Practices

4. Adjustment/Test

A. MLG Alignment

NOTE: Prior to jacking, aircraft must have been towed for a
minimum distance of 15 feet in a straight line to
overcome any tire deflection imposed by previous
movement.

R (1) Jack aircraft until tires are three inches clear of
ground and main landing gear strut pistons are fully
extended (Ref. 71-11-00).

(2) Level aircraft (Ref. 8-11-00, 8-12-00, 8-13-00).

EFFECTIVITY: ALL

32-11-00
Page 501
May 15/85

001B



MAINTENANCE MANUAL

- (a) Level points 2 and 3 within 0.080 inch for lateral leveling (Ref. Fig. 502).
- (b) Level points 11L and 11R within 0.020 inch for lateral leveling (Ref. Fig. 502).
- (3) Level both MLG trucks so that points 7L and R, and 8L and R are in the same plane ($\pm 1/16$ inch).
- (4) Drop plumb bobs from points 2, 3, 7L, 7R, 8L, and 8R to masking tape targets on floor. Mark targets. Establish line through plumb bob targets 2 and 3 to represent BL 0.0.
- (5) Check left gear truck alignment by measuring from point 7L and 8L target marks perpendicular to BL 0.0 (Ref. Fig. 503). Record distances as D1 and D2.
 - (a) Compute toe-in by subtracting D1 from D2. Toe-in should be 0.209 (± 0.068) inch; if not, relocate spacers as required. (Spacer relocation results in toe-in correction of approximately 2.5 times spacer thickness.)

NOTE: Total clearance in torque arm knee (between spacers) must not exceed 0.010 inch.
 - (b) If 0.209-inch toe-in cannot be obtained, relocate spacers to full adjustment capability.
- (6) Check right gear truck alignment by measuring from point 7R and 8R target marks to 7L and 8L target marks (Ref. Fig. 503). Record distances as D3 and D4.
 - (a) Compute toe-in by subtracting D3 from D4. Toe-in should be 0.418 (± 0.068) inch; if not, relocate spacers as required. (Spacer relocation results in toe-in correction of approximately 2.5 times spacer thickness.)

NOTE: Total clearance in torque arm knee (between spacers) must not exceed 0.010 inch.
 - (b) If 0.418-inch toe-in cannot be obtained, relocate spacers to full adjustment capability.
- (7) Secure torque arm apex as follows:
 - (a) Lubricate apex bolt nut and lower torque arm bearing face with grease.

LOCKHEED



MAINTENANCE MANUAL

- (b) Maintaining apex joint rotational freedom, torque apex bolt nut to a minimum of 5 lb ft so that locking bolt and nut can be installed. Do not exceed a torque of 150 lb ft.
- (8) Remove all Alignment and Symmetry Kit equipment.
- (9) Lower aircraft and remove jacks (Ref. 7-11-00).

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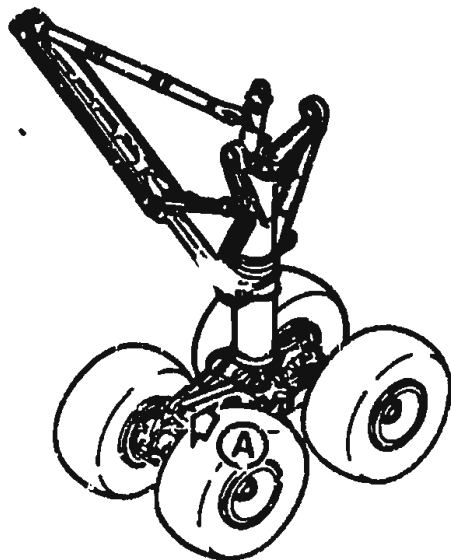
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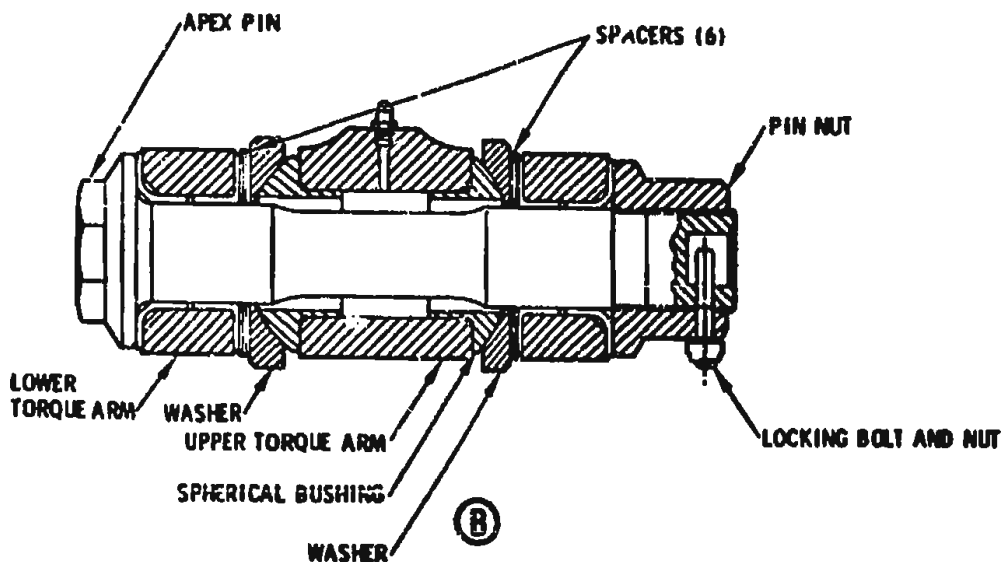
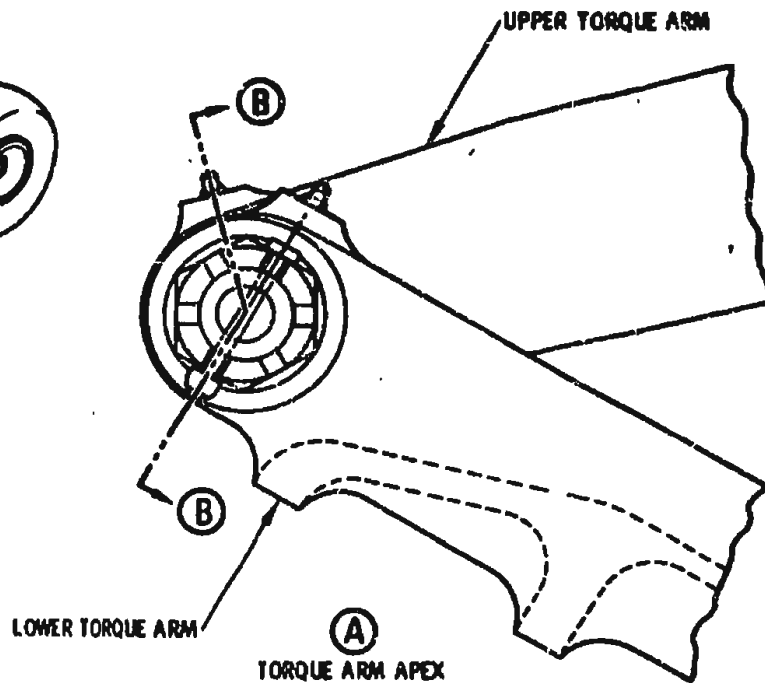
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Page 503
Nov 15/76

LOCKHEED
MAINTENANCE MANUAL



MAIN LANDING GEAR
ZONE 731 AND 741



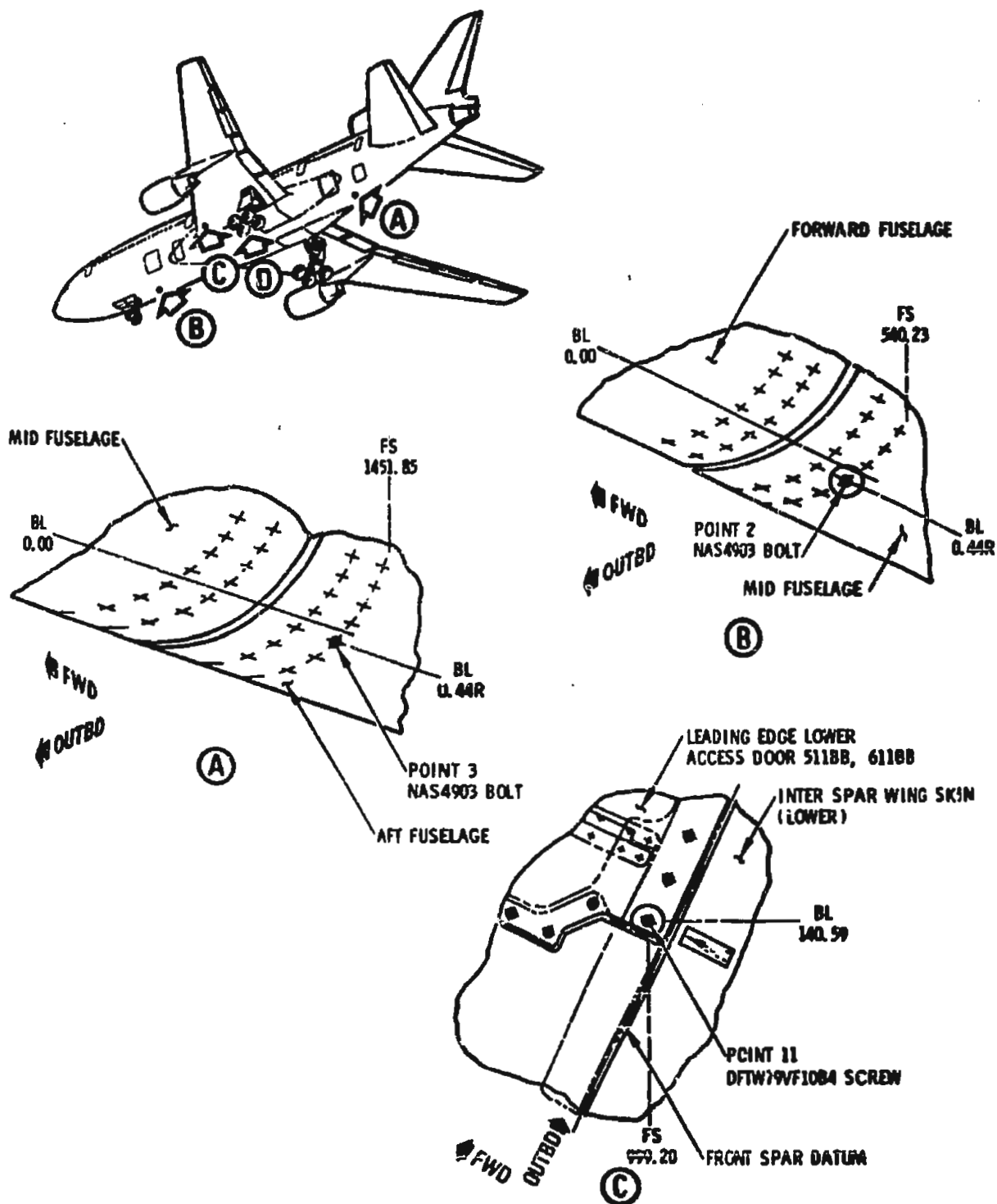
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Upper and Lower Torque Arm Apex Point
Figure 501

R R EFFECTIVITY: ALL
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32-11-00
Page 504
Nov 15/76

LOCKHEED
MAINTENANCE MANUAL



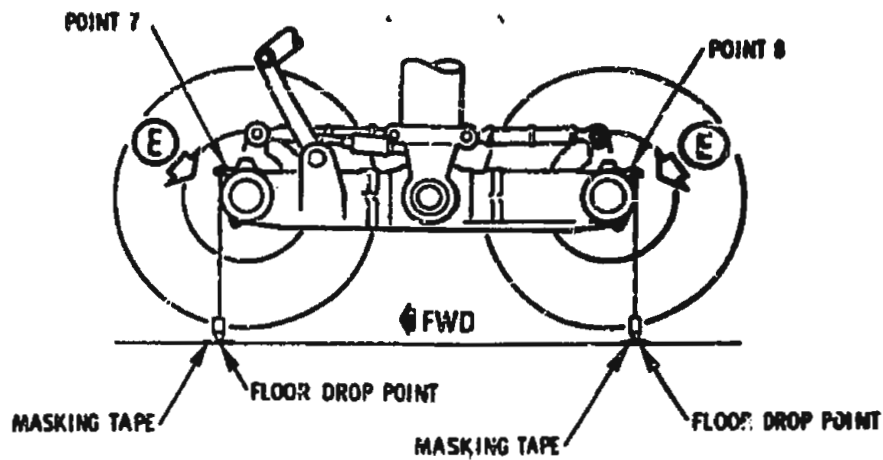
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Measurement Points
Figure 502 (Sheet 1)

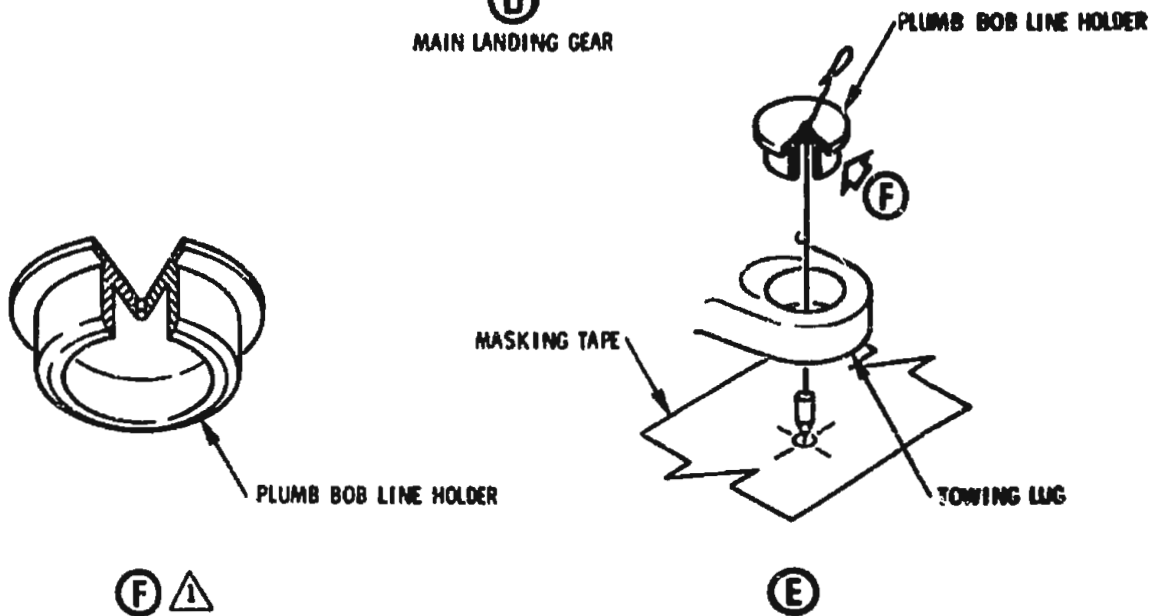
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001B

32-11-00
Page 505
Nov 15/76

LOCKHEED
MAINTENANCE MANUAL



①
MAIN LANDING GEAR



NOTE
⚠ PLUMB BOB AND LINE HOLDER ARE PART OF
ALIGNMENT AND SYMMETRY KIT

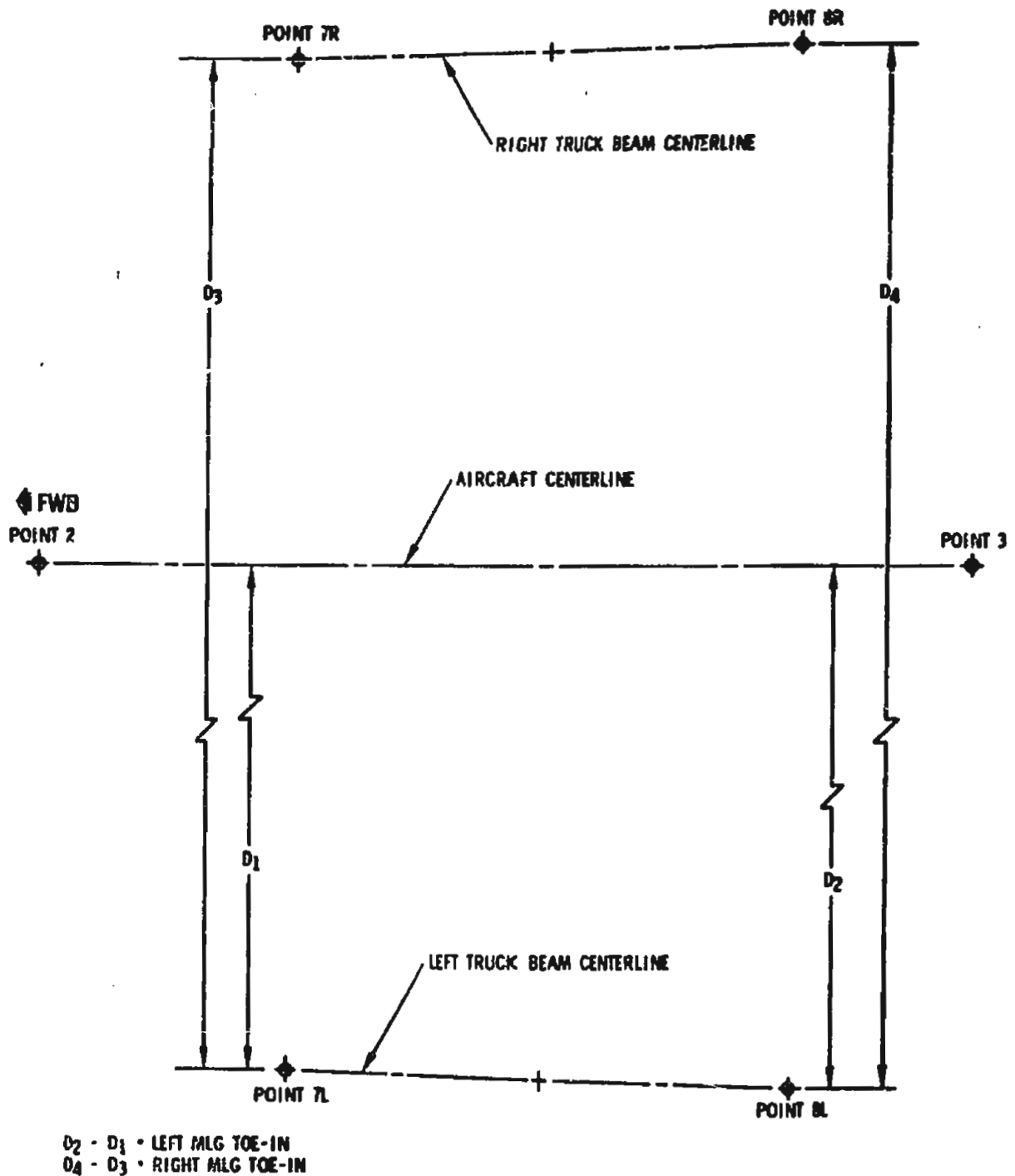
M1-0100-32-504

Measurement Points
Figure 502 (Sheet 2)

R R
001B EFFECTIVITY: ALL

32-11-00
Page 506
Nov 15/76

LOCKHEED
MAINTENANCE MANUAL



PLAN VIEW OF MARKING SURFACE

M1-0100-32-503

Main Landing Gear Measurement Diagrams
Figure 503

32-11-00
Page 507/508
Nov 15/76

EFFECTIVITY: ALL

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001B

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR ASSEMBLY - REMOVAL AND INSTALLATION

1. General

- R The MLG assembly is comprised of components listed below. For
R detailed procedures concerning removal and installation of a
R particular component, refer to the following sections:
- R 32-11-02 Main Landing Gear Shock Strut Assembly - Removal
R and Installation
- R 32-11-11 Main Landing Gear Upper Side Brace Assembly -
R Removal and Installation
- R 32-11-13 Main Landing Gear Lateral Brace Assembly - Removal
R and Installation
- R 32-32-01 Main Landing Gear Retract Actuator Assembly -
R Removal and Installation

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR SHOCK STRUT ASSEMBLY - REMOVAL AND INSTALLATION

1. General

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This procedure contains instructions for removal and installation of the main landing gear (MLG) shock strut assembly. The landing gear is removed from the landing gear well toward the aft end of aircraft. The flaps must be retracted in order to accomplish this. If the flaps are down and cannot be raised, the landing gear must be removed from the well toward the forward end of the aircraft. Procedures use of the Main Landing Gear Bootstrap Hoist Assembly, Dwg No. BG25, or equivalent equipment.

2. Equipment and Materials

Tugit Hoist, Model R239, 3 ton capacity, or equivalent

Tugit Hoist, Model R231A, 4-1/2 ton capacity, or equivalent

R Main Landing Gear Bootstrap Hoist Assembly, Dwg No. BG25, or equivalent

Main Landing Gear Side Brace Pin Replacement Tool Set, Dwg No. B967B, or equivalent

Main Landing Gear Actuator Pin Replacement Tool Set, Dwg No. B966NC, or equivalent

Main Landing Gear Trunnion Pins Adjustable Spanner Wrench, Dwg No. BC08, or equivalent

Main Landing Gear Aft Trunnion Pin Nut Adapter, Dwg No. BC07, or equivalent

Main Landing Gear Trunnion Pin Puller Tool Set, Dwg No. B960A, or equivalent

Main Landing Gear Trunnion Pin Insert Tool Set, Dwg No. B963A, or equivalent

Cotter Pin, MS24665-153, or equivalent

Cotter Pin, MS24665-300, or equivalent

R Grease, Ref. MM 12-20-00, Lubrication, Scheduled Servicing

Environmental Seal, C-40-769 Type II, or equivalent

EFFECTIVITY: ALL

001B

32-11-02
Page 401
May 15/85

LOCKHEED
MAINTENANCE MANUAL

Hydraulic Fitting protective caps and plugs

Lock-wire, Fed Spec QQ-W-390, 0.032-inch diameter, or equivalent

3. Referenced Procedures

7-11-00	Wing and Fuselage Jacking - Maintenance Practices
12-14-12	Main Landing Gear - Servicing
20-51-04	Environmental Sealing of Model L-1011 Airplane (PB75-425)
24-00-00	Electrical Power System - Maintenance Practices
29-11-00	Hydraulic Power System - Maintenance Practices
32-11-00	Main Landing Gear Assembly - Adjustment and Test
32-11-11	Main Landing Gear Upper Side Brace Assembly - Removal and Installation
32-11-13	Main Landing Gear Lateral Brace Assembly - Removal and Installation
32-12-02	Main Landing Gear Fixed Door - Removal and Installation
32-30-00	Landing Gear Retraction and Extension - Adjustment and Test
32-32-01	Main Landing Gear Retract Actuator Assembly - Removal and Installation
32-33-00	Main Landing Gear Inboard Door - Maintenance Practices
32-37-00	Landing Gear Mechanical Alternate Extension System - Maintenance Practices
32-43-00	Main Landing Gear Brake System - Maintenance Practices
32-61-08	Main Landing Gear Truck Unlevel Position Sensor - Adjustment and Test
32-61-09	Main Landing Gear Mechanical Downlock Indicator - Removal and Installation

R Structural Repair Manual 57-14-00, Landing Gear Support
R Structure - Damage Limits and Repair

EFFECTIVITY: ALL

001B

32-11-02
Page 402
Dec 15/93

LOCKHEED
MAINTENANCE MANUAL

4. Removal/Installation

A. Preliminary Procedures

- (1) Install right and left MLG and NLG downlock safety pins.
- (2) Open applicable MLG door and install MLG inboard door actuator lock (Ref. 32-33-00).
- (3) At filler valve (top of strut), release air or nitrogen charge from shock strut by removing dust cap on charging valve and turning upper nut on valve assembly three to four turns counterclockwise. Remove valve.
- (4) Ensure that hydraulic systems B and C pressure is 0 psi (Ref. 29-11-00).
- (5) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, ensure that circuit breakers PARKING BRAKE NO. 1 (G18), PARKING BRAKE NO. 2 (G22), and BRAKE PRES IND (G21) are closed.
- (6) Turn on electrical power (Ref. 24-00-00).
- (7) On pilots center instrument panel, zone 210, place BRAKE SYS SELECT switch in the SYS B position. Depress and release brake pedals until brake pressure is 0 psi.
- (8) Place BRAKE SYS SELECT switch in the SYS C position. Depress and release brake pedals until brake pressure is 0 psi.
- (9) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breakers BRAKE TEMP IND AC (G20) and DC (G19), BRAKE ANTISKID (F22), and GEAR TRUCK LEVEL (F16).
- (10) If the flaps are down, raise flaps (Ref. 27-51-00). The MLG is normally removed in an aft direction. Flaps must be in the up position to accomplish this.
- (11) Turn off electrical power (Ref. 24-00-00).
- (12) Turn off hydraulic system A (Ref. 29-11-00).
- (13) Disconnect upper (outboard) MLG door linkage at strut.
- (14) Remove fixed (lower) MLG door (Ref. 32-12-02).
- (15) Disconnect MLG downlock indicator assembly; do not remove indicator from wing (Ref. 32-61-09).

R EFFECTIVITY: ALL
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32-11-02
Page 403
May 15/85



MAINTENANCE MANUAL

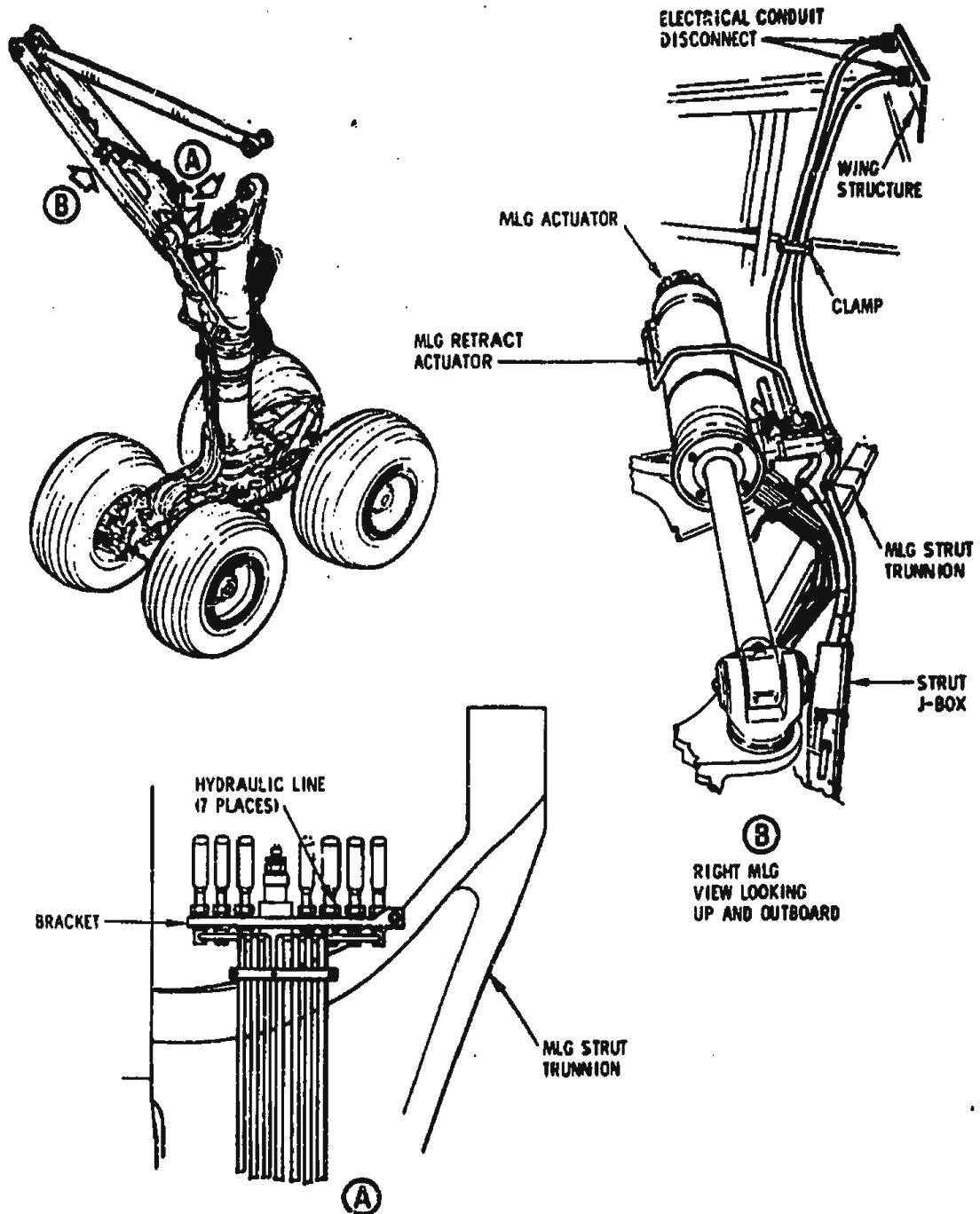
- (16) Verify that hydraulic systems B and C, and normal and alternate brake system pressures are 0 psi.
- (17) At top of strut, disconnect seven hydraulic lines (Ref. Fig. 401).
- (18) Cap all fittings and plug all lines to prevent fluid leakage and contamination.
- (19) At MLG well outboard aft bulkhead, disconnect two electrical conduits (Ref. Fig. 401).
- (20) Remove wing lower panel 541CB or 641CB, aft of MLG strut well (Ref. 6-40-00).
- (21) Remove triangular panel directly aft of rear MLG trunnion pin to gain access to trunnion pin nut.
- (22) Remove electrical conduits from restraining clamps (wing structure); coil conduit and secure to MLG strut.

B. Removal (Using Bootstrap Equipment)

WARNING: STRUT PRESSURE MUST BE 0 PSI AND VALVE MUST BE REMOVED BEFORE JACKING AIRCRAFT.

- (1) Jack aircraft (Ref. 7-11-00) to a height that will permit full extension of strut while aircraft is on jacks (approximately 30 inches).
- (2) Remove MLG retract actuator (Ref. 32-32-01).
- (3) Lay out and inventory all bootstrap components (Ref. Fig. 402)
- (4) Attach upper adapter assembly to landing gear support structure as follows (Ref. Fig. 402):
 - (a) Attach adapter (View G) to retract actuator upper fitting (View A) using support pin.
 - (b) Install extension tube on forward arm of adapter (View G) such that holes in tube and adapter arm can be aligned.
 - (c) Slide support arm (View F) over extension tube and secure to tube and adapter with attached lockpin (View B).
 - (d) Attach turnbuckle between support arm and adapter; secure with attached lockpin.

LOCKHEED
MAINTENANCE MANUAL



⑧
RIGHT MLG
VIEW LOOKING
UP AND OUTBOARD

HH 8725
M1-0100-32-122

Hydraulic Line and Electrical Conduit Disconnect
Figure 401

EFFECTIVITY: ALL

001B

32-11-02
Page 405
Aug 15/75



MAINTENANCE MANUAL

- (e) Slide collar and clamp (View E) over extension tube and secure clamp to lateral brace. Secure collar with lockpin.
- (f) Assembly must appear as shown in Views A and B.
- (5) Attach strut adapter assembly to landing gear as follows (Ref. Fig. 402):
 - (a) Insert sleeve into retract actuator lower bearings (View A).
 - (b) Assemble truck support hanger (View I), four short spacers, and strut support lug on support pin (View H).
 - (c) Install long spacer and one washer on support pin (View C).
 - (d) Insert support pin into sleeve in actuator bearing (View A).
 - (e) Install one washer on pin and secure pin to actuator bearing with attached lockpin.
 - (f) Install clamp assembly around lower side brace and onto support pin.
 - (g) Secure in place with attached lockpin.
 - (h) Align all components and tighten clamp assembly bolt.
 - (i) Assembly must appear as shown in Views A and C.
- (6) Attach truck support sling (View D) to truck as follows (View A):
 - (a) Remove thru-bolts and end caps from brake torque link pins and install hanger assemblies.
 - (b) Attach cable assembly to hanger assemblies with shackles.
 - (c) Assembly must appear as shown in Views A and D.
- (7) Rig a 4-1/2-ton hoist to hang from support arm (View B) and connect to strut support lug (View C).
- (8) Rig a 3-ton hoist to hang from truck support hanger (View I) and connect to truck support sling (View D).

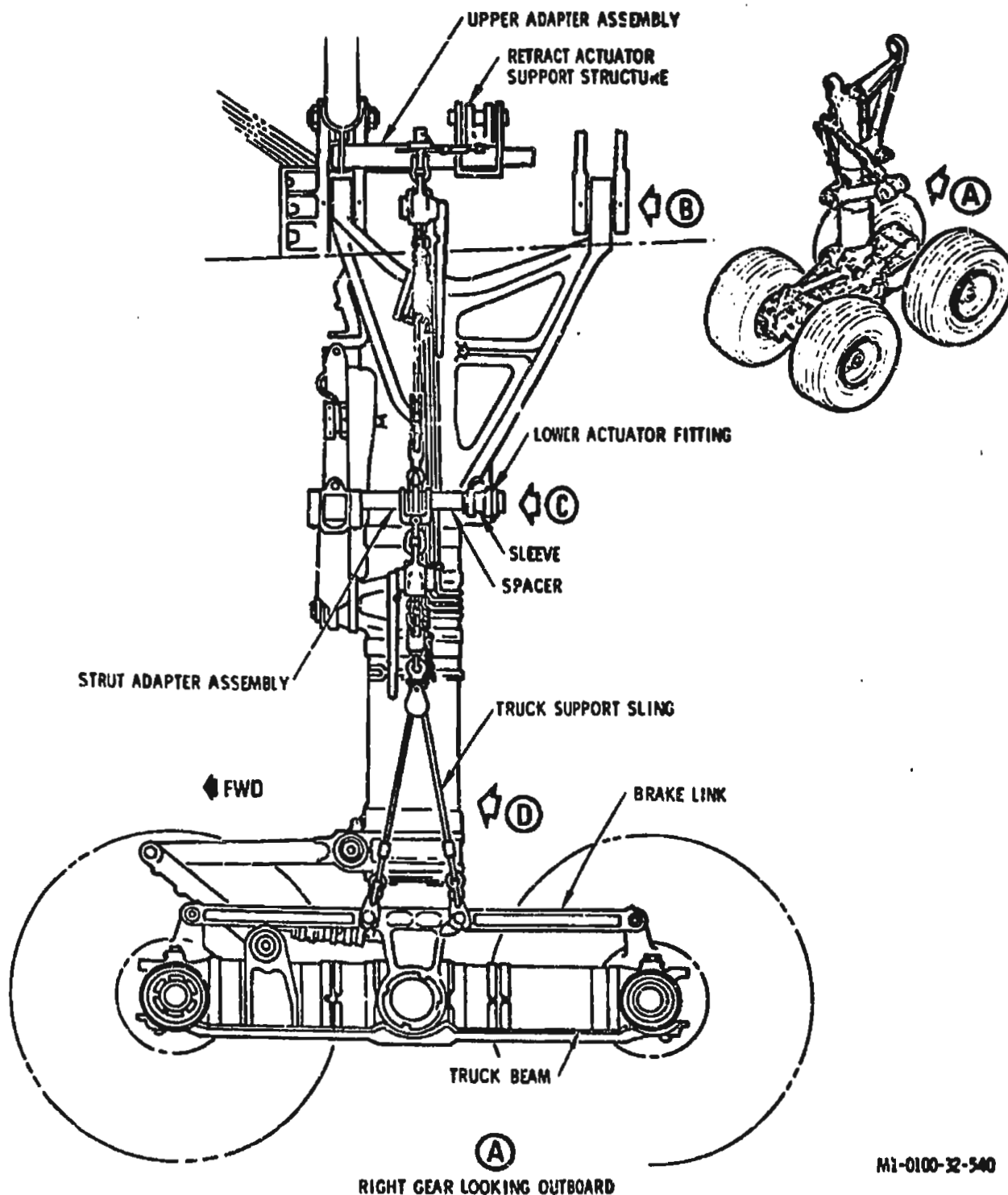
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EFFECTIVITY: ALL

001B

32-11-02
Page 406
May 15/85

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-540

Bootstrap Equipment Rigging
Figure 402 (Sheet 1)

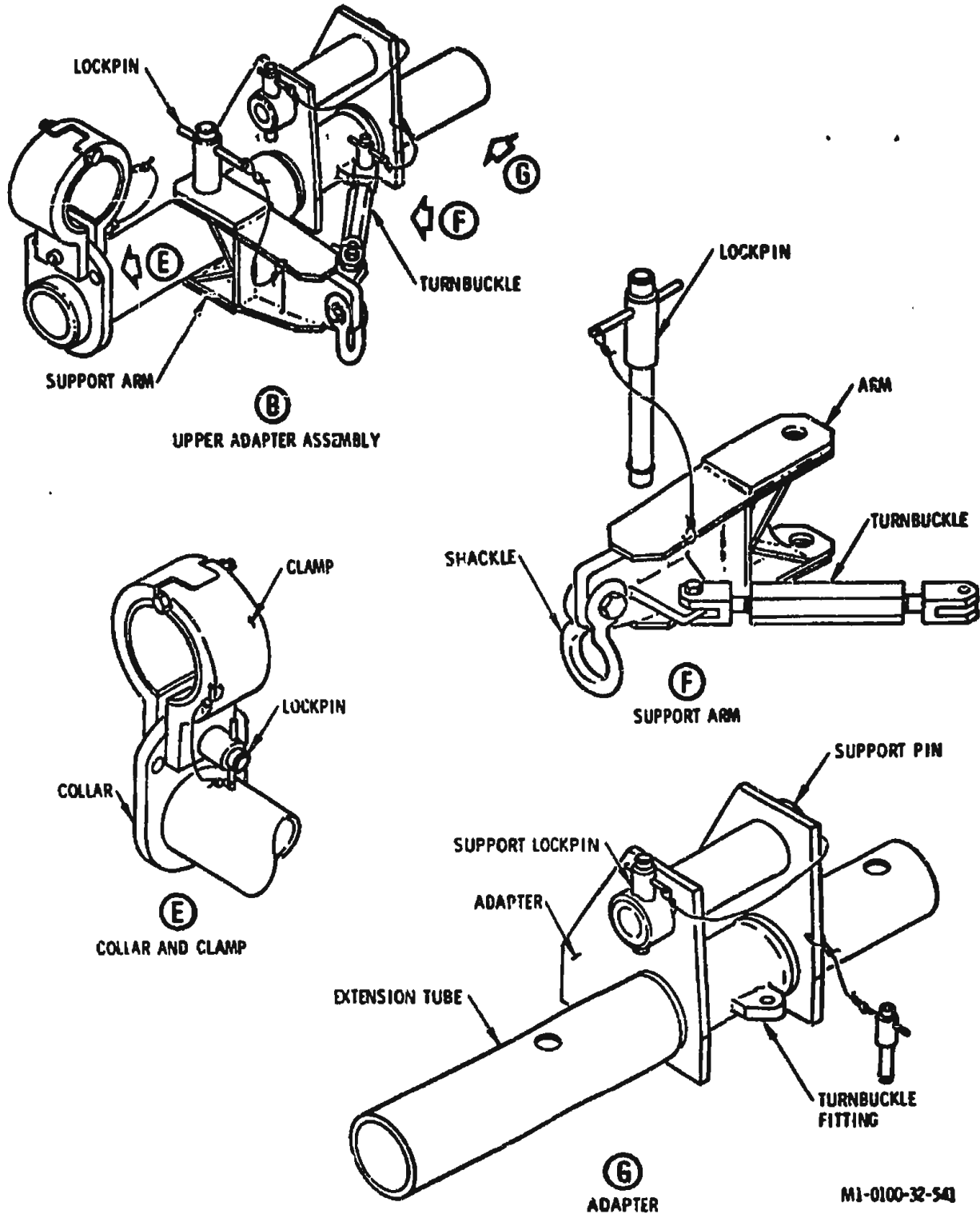
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32-11-02
Page 407
Aug 15/75

LOCKHEED
MAINTENANCE MANUAL



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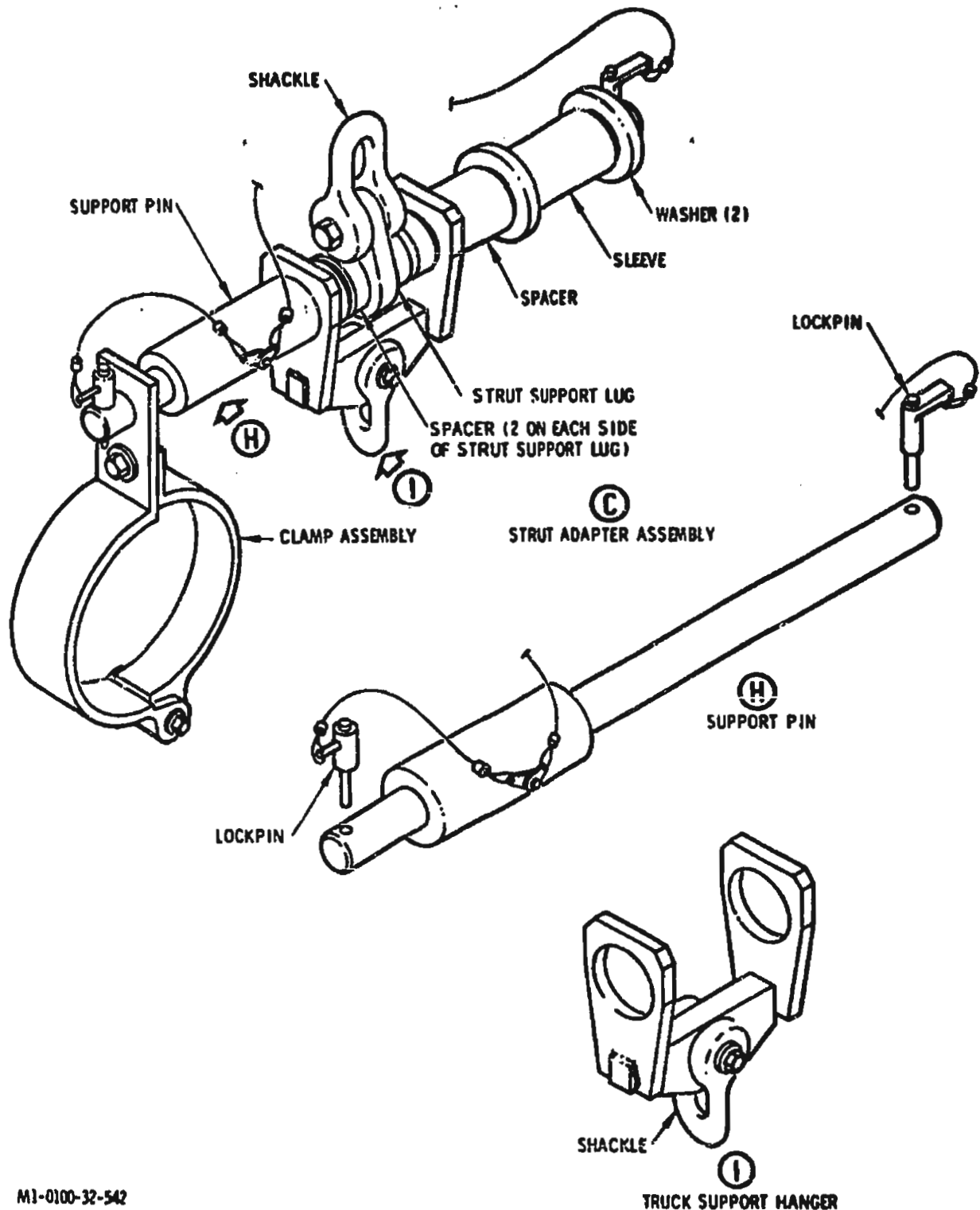
Bootstrap Equipment Rigging
Figure 402 (Sheet 2)

32-11-02
Page 408
Aug 15/75

EFFECTIVITY: ALL

001B

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-542

Bootstrap Equipment Rigging
Figure 402 (Sheet 3)

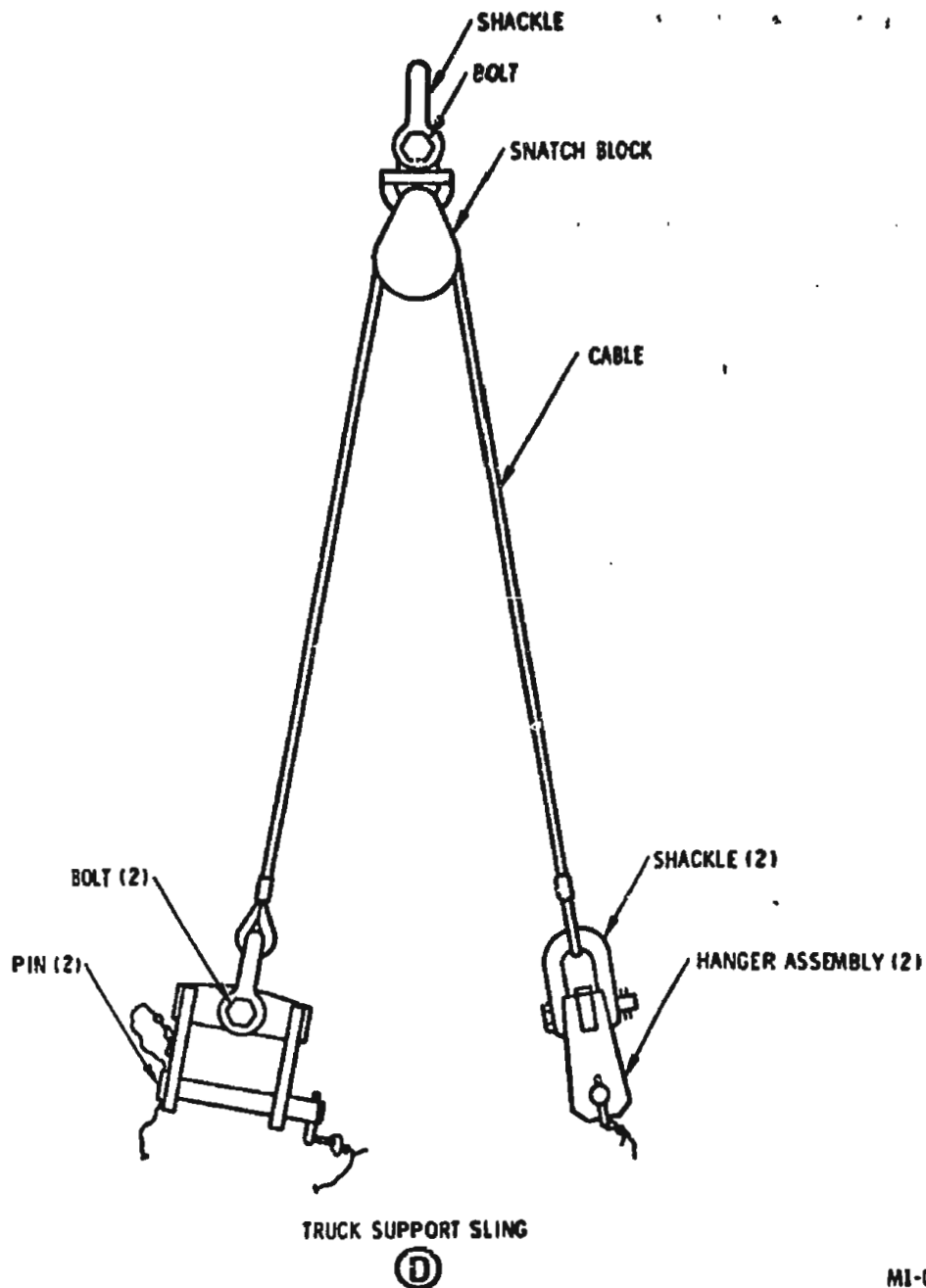
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32-11-02
Page 409
Aug 15/75

LOCKHEED
MAINTENANCE MANUAL



MI-0100-32-543

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Bootstrap Equipment Rigging
Figure 402 (Sheet 4)

EFFECTIVITY: ALL

001B

32-11-02
Page 410
Aug 15/75



- (9) Rigged assemblies must appear as shown in View A.
- (10) Using lower hoist, raise truck until wheels clear ground by approximately three inches.
- (11) Raise or lower truck, as required, to take pressure off of side brace pin (junction of upper side brace, lower side brace, and jury brace) so that pin can be rotated using a spanner on pin head.

NOTE: The geometry of the landing gear and the bootstrap hoisting equipment is such that raising the truck causes the gear to swing inboard and lowering the truck causes the gear to swing outboard.

- (12) Disconnect upper side brace from lower side brace (Ref. 32-11-11).
- (13) Raise upper side brace until clear of work area and secure to lateral brace.
- (14) Remove trunnion pins as follows (Ref. Fig. 404):

CAUTION: WITHOUT THE SUPPORT PROVIDED BY THE TRUNNION PINS, THE STRUT MAY NOT REMAIN IN A VERTICAL POSITION WHEN THE PINS ARE REMOVED. A MEANS MUST BE PROVIDED TO PREVENT THE STRUT FROM FALLING FREELY FORWARD OR AFT.

R

- (a) On aircraft 001-031 with SB32-167 and without SB32-169, remove trunnion pin retainers (Ref. Fig. 403).
- (b) Remove lockbolts from trunnion pin nuts.
- (c) Remove both trunnion pin nuts using trunnion pin adjustable spanner wrench and aft trunnion pin nut adapter.
- (d) Ensure that side loads on trunnion pins are reduced to a minimum by raising gear using upper hoist until trunnion pins can be rotated using spanner wrench. If pins cannot be rotated, do not use excessive force on wrench.

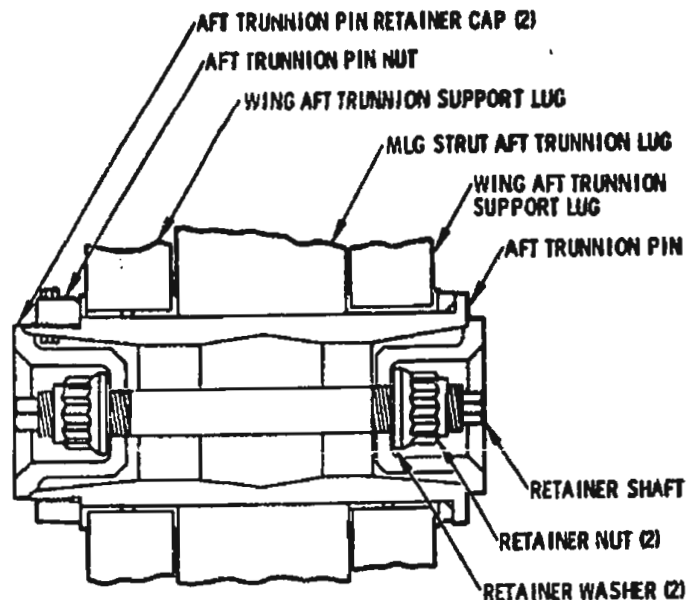
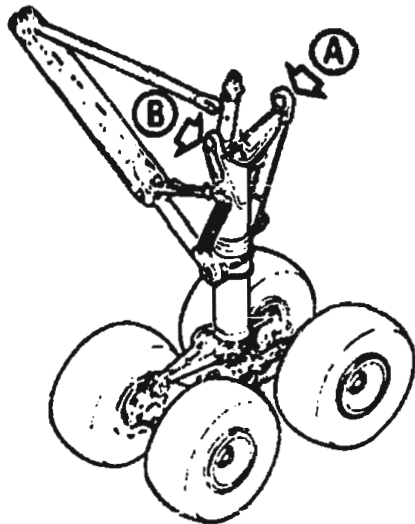
CAUTION: REMOVAL OF TRUNNION PINS BY FORCE WITH EXCESSIVE LOADS ON TRUNNIONS WILL CAUSE

EFFECTIVITY: ALL

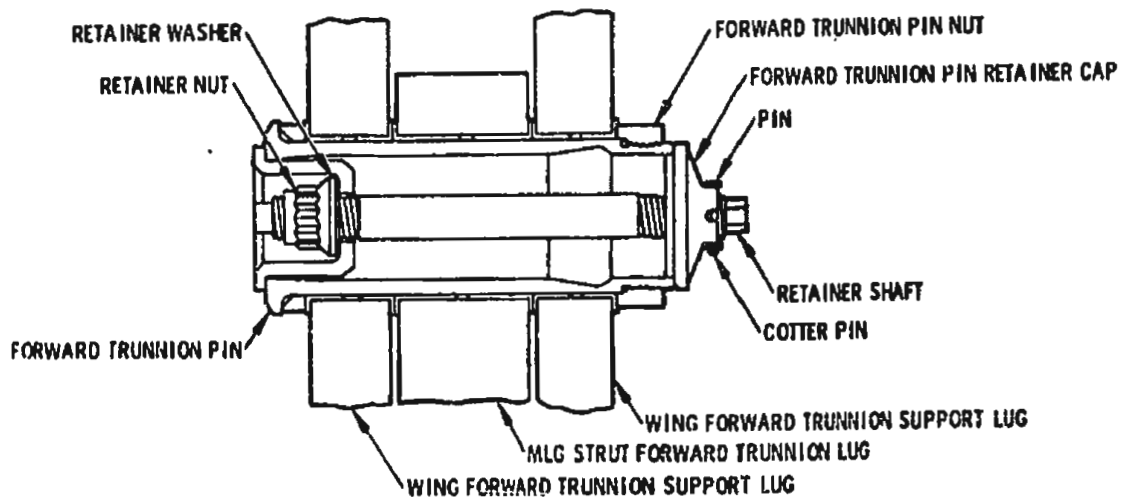
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32-11-02
Page 411
May 15/88

LOCKHEED
MAINTENANCE MANUAL



(A)



(B)

M1-0000-32-184

Trunnion Pin Retainer - Removal and Installation
Figure 403

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R
001B

EFFECTIVITY: 001-031 WITH SB22-167 WITHOUT
SB32-169

32-11-02
Page 412
May 15/86

LOCKHEED
MAINTENANCE MANUAL

BUSHINGS IN MLG TRUNNION AND MLG TRUNNION FITTING TO LOOSEN AND MIGRATE. THIS CAN BE PREVENTED BY PROPER ALIGNMENT TO REMOVE LOADS AND USE OF REMOVABLE HALF CIRCLE SHIMS BETWEEN BUSHING FLANGES AS REQUIRED.

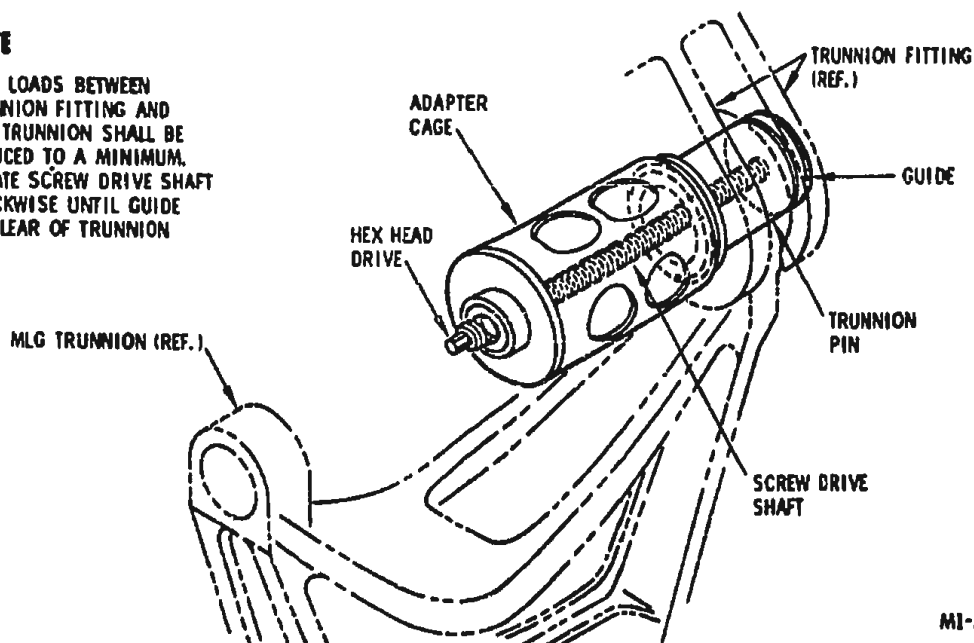
- (e) Remove both pins half way using MLG trunnion pin puller tool set. Check pins for ease of rotation. Adjust hoist as required.
- (f) When hoist adjustment results in minimum side load on pins, remove pins.
- (15) Lower MLG using bootstrap equipment until wheels are within approximately one inch of ground.
- (16) Position MLG in a vertical attitude by raising or lowering the truck. Lower gear all the way.

CAUTION: THE MLG STRUT MAY NOT REMAIN IN A VERTICAL POSITION AFTER THE BOOTSTRAP EQUIPMENT IS REMOVED. IN ORDER TO PREVENT THE STRUT FROM FREELY FALLING FORWARD OR AFT, RESTRAINT MUST BE PROVIDED.

- (17) Secure strut vertically in relation to truck, then disconnect bootstrap equipment and remove landing gear.

NOTE

SIDE LOADS BETWEEN TRUNNION FITTING AND MLG TRUNNION SHALL BE REDUCED TO A MINIMUM. ROTATE SCREW DRIVE SHAFT CLOCKWISE UNTIL GUIDE IS CLEAR OF TRUNNION



HH 6392
M1-A00-32-126

Trunnion Pin - Removal
Figure 404

R EFFECTIVITY: ALL
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001B

32-11-02
Page 413
May 15/86

LOCKHEED
MAINTENANCE MANUAL

C. Installation (Using Bootstrap Equipment)

- R (1) Before proceeding with landing gear installation,
R verify that wing fitting lugs and bushings are within
R limits specified in SRM 57-14-00, 801. Rework as
R required.
- R (2) Secure strut vertically in relation to truck.
- R (3) Service strut with hydraulic fluid using gravity method
R (Ref. 12-14-12).
- R (4) Position MLG under wheel well so that trunnion lugs are
R below structure trunnion fitting.
- R (5) Install bootstrap equipment to landing gear support
R structure and to landing gear as described in Steps
R 4.B(5) through (9).
- R (6) Using upper hoist, raise MLG until trunnion pin
bushings on structure and landing gear are aligned.

NOTE: Vertical attitude of the landing gear can be changed for alignment purposes by raising or lowering the truck with respect to the strut using the lower hoist.

CAUTION: ENSURE THAT THE APPLICABLE TRUNNION PINS ARE INSTALLED. FAILURE TO DO SO COULD RESULT IN PIN DAMAGE.

CAUTION: INSTALLATION OF TRUNNION PINS BY FORCE WITH EXCESSIVE LOADS ON TRUNNIONS WILL CAUSE BUSHINGS IN MLG TRUNNION AND MLG TRUNNION FITTING TO LOOSEN AND MIGRATE. THIS CAN BE PREVENTED BY PROPER ALIGNMENT TO REMOVE LOADS AND USE OF REMOVABLE HALF CIRCLE SHIMS BETWEEN BUSHING FLANGES AS REQUIRED.

- R (7) Install trunnion pins as follows (Ref. Fig. 405):

NOTE: If trunnion pins cannot be installed by hand pressure, use MLG trunnion pin inserter tool set.

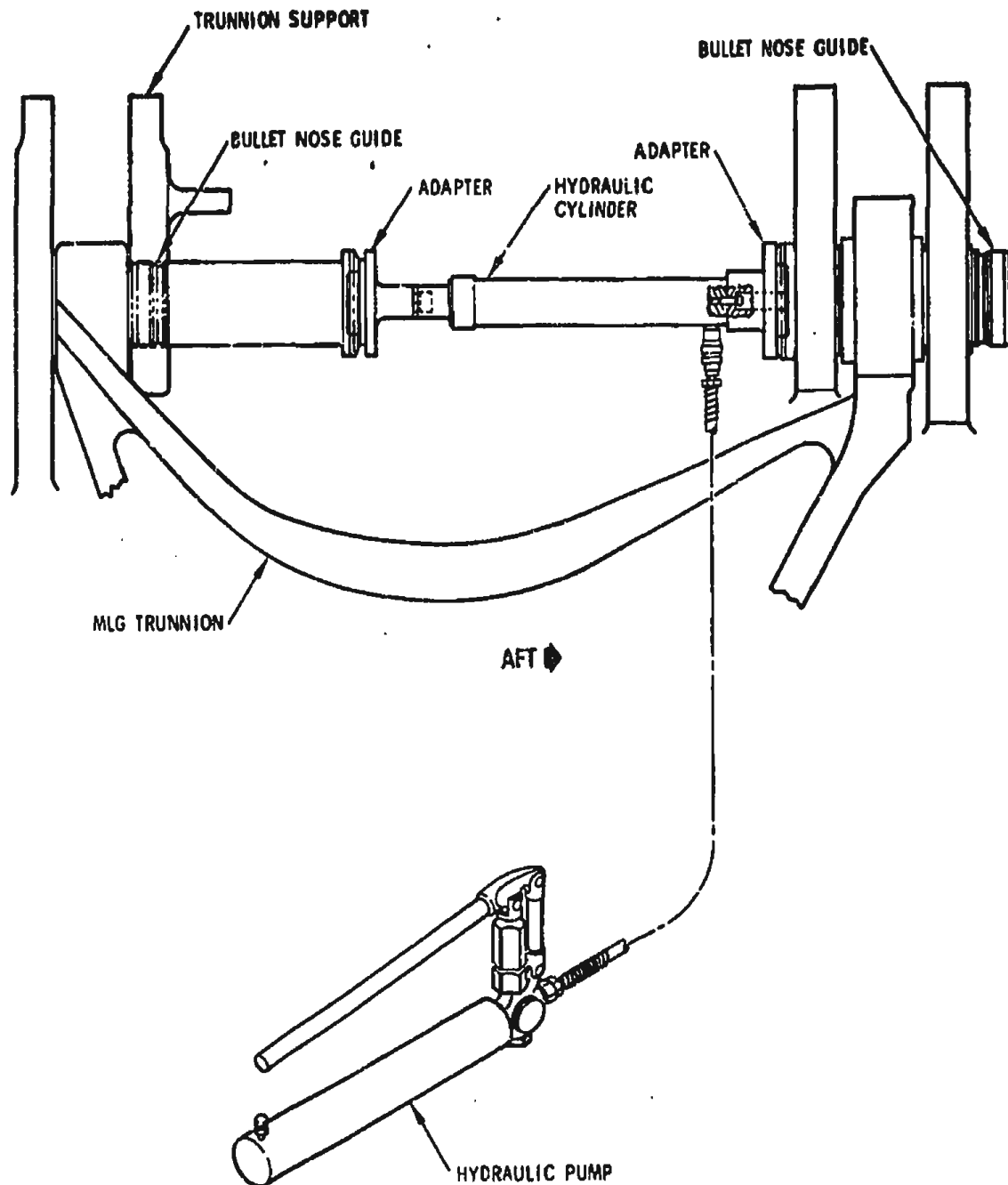
- (a) Install trunnion pin inserter bullet-nose guides on each trunnion pin.
- (b) Coat OD, head flange, and spacer of each pin with grease.

EFFECTIVITY: ALL

001B

32-11-02
Page 414
Dec 15/93

LOCKHEED
MAINTENANCE MANUAL



NOTE

THE HYDRAULIC CYLINDER ADAPTERS,
BULLET NOSE GUIDES, AND HYDRAULIC
PUMP MAKE UP THE TRUNNION PIN INSERTER.
RIGHT MLG SHOWN, LEFT GEAR OPPOSITE

M1-0101-32-127

R
R

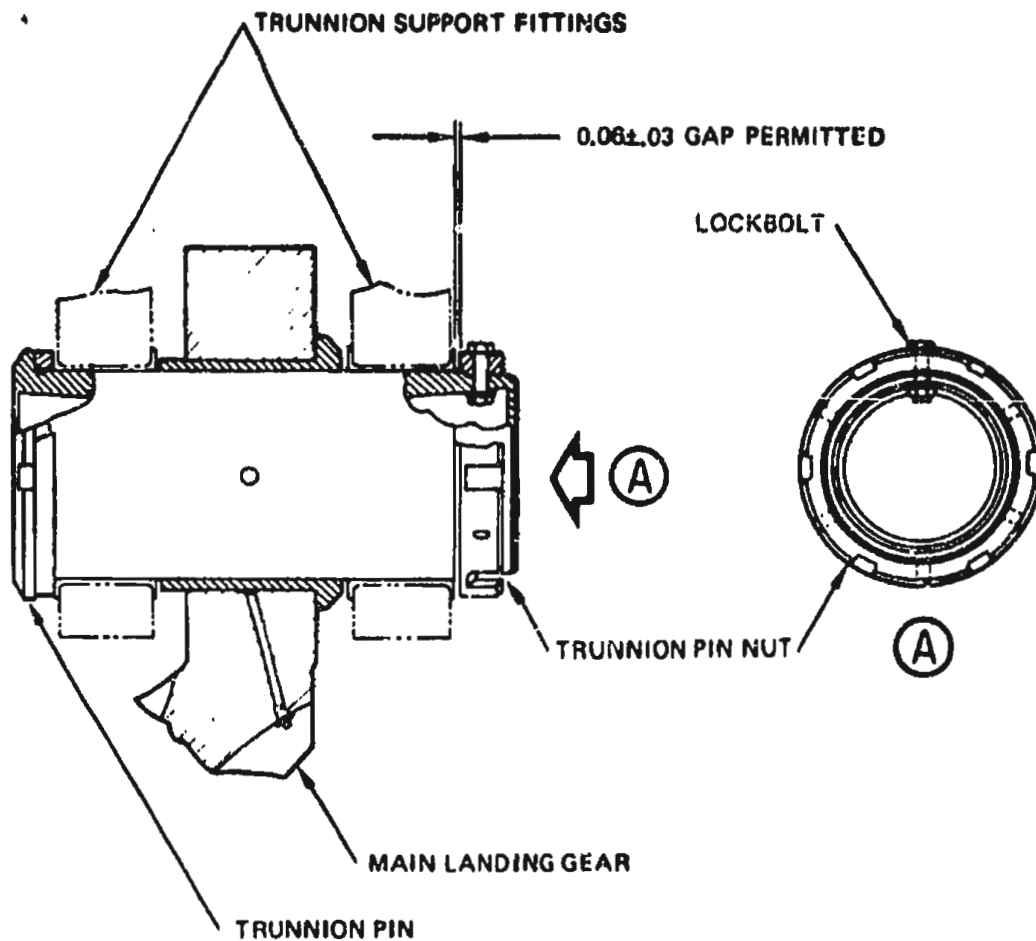
Trunnion Pin - Installation
Figure 405

EFFECTIVITY: ALL

001B

32-11-02
Page 415
May 15/82

LOCKHEED
MAINTENANCE MANUAL



M1-0001-32-2835

CR
CR

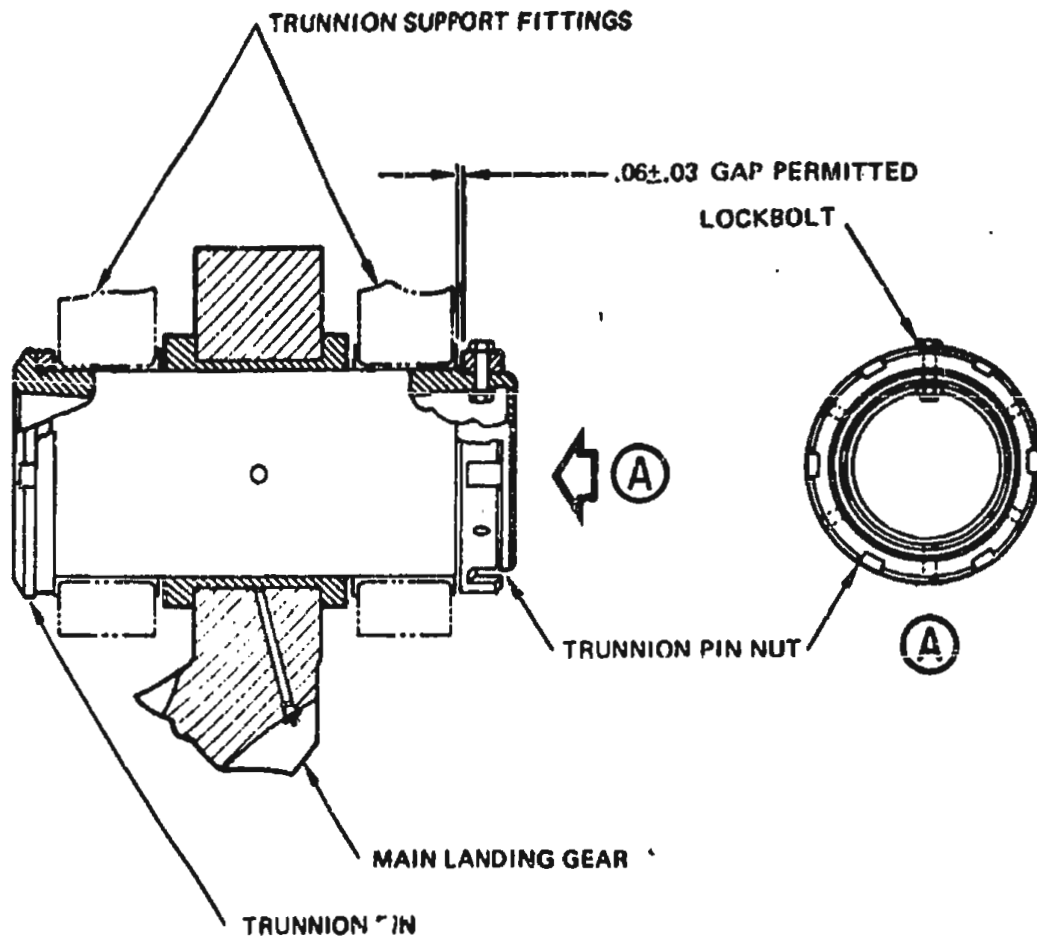
Main Landing Gear Aft Trunnion
Figure 406

EFFECTIVITY: 001-031

001B

32-11-02
Page 416
May 15/88

LOCKHEED
MAINTENANCE MANUAL



VIEW LOOKING INBOARD AT LH GEAR AFT TRUNNION

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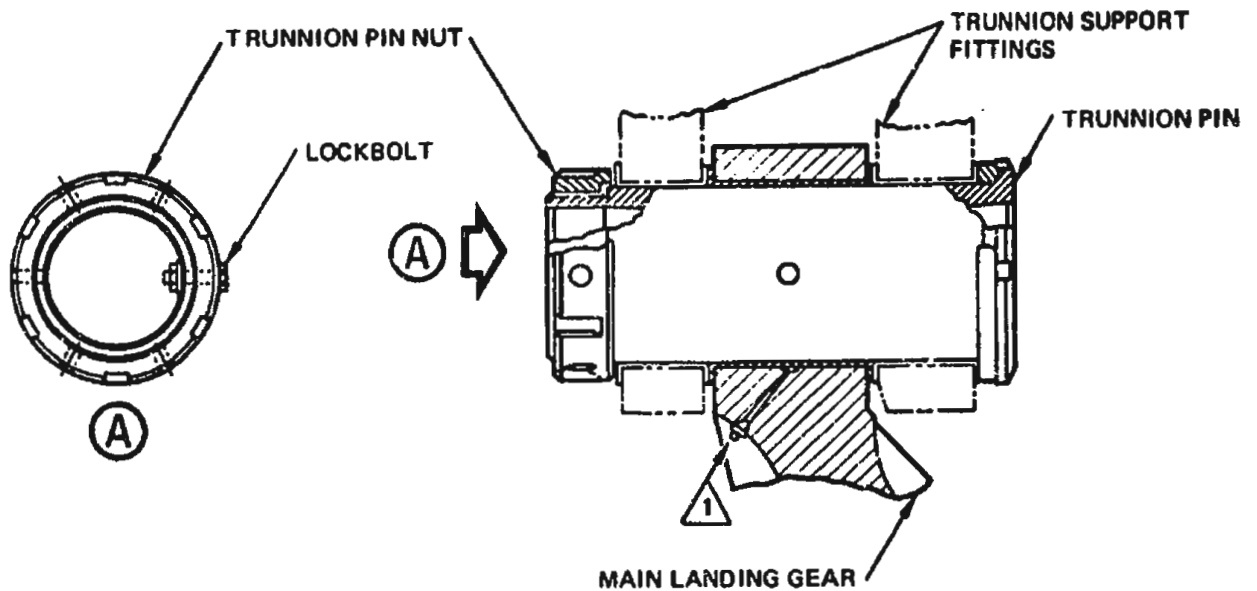
Main Landing Gear Aft Trunnion
Figure 406

EFFECTIVITY: 032-999

001B

32-11-02
Page 417
May 15/88

LOCKHEED
MAINTENANCE MANUAL



VIEW LOOKING INBOARD AT LH GEAR FORWARD TRUNNION

 ENSURE 45 DEGREE LUBE FITTING IS INSTALLED

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R
R

Main Landing Gear Forward Trunnion
Figure 407

EFFECTIVITY: ALL

001B

32-11-02
Page 418
Aug 15/82



- (c) Insert a trunnion pin into either support structure bearing.
- (d) Position MLG trunnion pin inserter tool set hydraulic cylinder with adapters attached, between trunnion pin and opposite trunnion support. Operate pump until cylinder is snug against trunnion pin head and trunnion support.
- (e) Continue to operate pump until trunnion pin is seated in position.
- (f) Repeat procedure for opposite trunnion pin.
- (g) Remove bullet-nose guides and trunnion pin inserter.

NOTE: During trunnion pin installation, it may be necessary to make alignment adjustments using bootstrap hoists.

- (h) Coat trunnion pin threads with environmental seal.
- (i) Install trunnion pin nuts. Using trunnion pin spanner wrench and trunnion pin nut adapter, tighten trunnion pin nuts. Do not tighten beyond snug fit.

R
R

- (8) Align locking holes and install lockbolts. Install and tighten nuts, and safety with cotter pins.

R
R

- (9) On aircraft 001-031 with SB32-167 and without SB32-169, proceed as follows:

R
R

- (a) Apply environmental seal to forward and aft trunnion pin retainers (Ref. 20-51-04).

R
R

- (b) Install forward and aft trunnion pin retainers (Ref. Fig. 403).

R
R

- (c) Torque forward and aft trunnion pin retainer nuts to 416 (± 20) lb ft.

R
R
R

NOTE: To prevent trunnion pin retainer shaft from rotating when tightening retainer nut hold shaft with wrench at wrenching hexagonal.

R
R
R

- (d) Apply environmental seal to all exposed thread surfaces on forward and aft trunnion pin retainers (Ref. 20-51-04).

EFFECTIVITY: ALL

001B

32-11-02

Page 419
Dec 15/93



- (10) Remove any restraints, other than bootstrap equipment, installed to retain strut in vertical position.
- (11) Connect upper side brace to lower side brace and jury brace (Ref. 32-11-11).
- (12) Remove bootstrap equipment from landing gear and support structure.
- (13) Install MLG retract actuator (Ref. 32-32-01).
- R (14) With strut fully extended, service with nitrogen to a
R pressure of 410 (± 15) psi (Ref. 12-14-12).

D. Finishing Procedures

- (1) Connect MLG downlock indicator assembly (Ref. 32-61-09).
- (2) At top of strut, connect seven hydraulic lines (Ref. Fig. 401).
- (3) At MLG well outboard aft bulkhead, connect two electrical conduits and restraining clamps (Ref. Fig. 401).
- (4) Install fixed door (Ref. 32-12-02).
- (5) At upper (outboard) door, verify that linkage is secured to strut and that door was adjusted during fixed door installation in Step (4).
- (6) Turn on electrical power (Ref. 24-00-00).

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (7) Turn on hydraulic systems B and C (Ref. 29-11-00).
- (8) Bleed normal and alternate brake system (Ref. 32-43-00).

EFFECTIVITY: ALL

001B

32-11-02
Page 420
Jun 15/96



MAINTENANCE MANUAL

- (9) Bleed truck positioner by opening bleed valve located on positioner control valve.
- (10) Install triangular panel directly aft of aft trunnion pin.
- (11) Install wing lower panel, 541CB or 641CB, aft of MLG strut well.
- (12) Remove tags and close circuit breakers opened in Step 4A(9).

C

- (13) DELETED

CAUTION: PRIOR TO RETRACTION, ANY RESTRAINTS USED TO RETAIN THE STRUT IN A VERTICAL POSITION MUST BE REMOVED.

- (14) Retract and extend gear with reduced pressure and at slow speed. Check for ease of operation, and inspect for rubbing or chafing between the main landing gear upper side brace and trailing edge intercostal (Ref. 32-30-00). If any indications of chafing or rubbing are found, rework in accordance with SB 57-051.
- (15) Perform mechanical alternate extension (Ref. 32-37-00).
- (16) Perform truck unlevel position sensor test (Ref. 32-61-08).
- (17) Perform pilots control monitor BITE test (Ref. 32-44-00).

NOTE: This test verifies anti-skid electrical connections, but does not indicate cross-connection or possible system malfunction. Refer to 32-44-00 when necessary for test.

- (18) Lower aircraft and remove jacks (Ref. 7-11-00).
- (19) Check strut for correct servicing with nitrogen. Service as required (Ref. 12-14-12).
- (20) Close applicable MLG inboard door and remove MLG door actuator lock (Ref. 32-33-00).
- (21) Turn off hydraulic system B and C pressure (Ref. 29-11-00).
- (22) Turn off electrical power as required (Ref. 24-00-00).

R EFFECTIVITY: ALL

001B

32-11-02
Page 421/422
Dec 15/93

LOCKHEED
MAINTENANCE MANUAL

C MAIN LANDING GEAR SHOCK STRUT - INSPECTION AND CHECK

C 1. General

C This procedure provides instructions concerning inspection of
C the MLG Shock Strut Piston for cracking in the exposed chrome
C plated surface of the piston barrel. This inspection may be
C performed during routine wipe down and cleaning of the piston
C chrome surface and/or during routine MLG area inspections.

C 2. Equipment and Materials

CR A good light for visual inspection

R Trichloroethylene solvent, Fed. Spec 0-T-620, or equivalent

R 3. Referenced Procedures

R 12-24-01 Main Landing Gear - Servicing

R 32-11-02 Main Landing Gear Shock Strut Assembly - Removal
R and Installation

CR 4. Inspection/Check

C A. Inspection

C (1) Check exposed chrome surface of the piston barrel for
C visually obvious cracks or surface discontinuity. See
C Fig. 601 for typical crack.

C (2) A piston having cracks has both ultimate strength and
C adequate fatigue strength for up to 10 landings after
C discovery of a crack or cracks based upon the following
C limitations:

C (a) Single crack length is 1.2 inch or less (piston
C circumferential length).

C (b) Summation of circumferential widths of multiple
C cracks is less than 2.0 inches.

C (c) Multiple cracks do not overlap or intersect.

C (d) The crack shall be inspected for the above
C limitations at each postflight inspection.

EFFECTIVITY: ALL

005B

32-11-02
Page 601
Aug 15/82



MAINTENANCE MANUAL

C (e) Establish a follow up with MCIMD for piston
C replacement prior to accumulation of 10 landings.

C (3) Cracks exceeding above limits require piston
C replacement prior to further service.

R B. Inspection (shock strut piston clevis lugs)

R WARNING: ENSURE THAT SAFETY PINS ARE INSTALLED IN MAIN
R LANDING GEAR (MLG) AND NOSE LANDING GEAR (NLG)
R DOWN-LOCK MECHANISMS AND THAT NLG AND MLG WHEELS
R ARE BLOCKED FORE AND AFT.

R TAG LANDING GEAR CONTROL LEVER IN COCKPIT.

R USE SOLVENT IN A WELL VENTILATED AREA. DO NOT
R INHALE SOLVENT VAPORS OR ALLOW SOLVENT TO COME IN
R CONTACT WITH THE SKIN. KEEP SOLVENT AWAY FROM
R OPEN FLAME.

R (1) Using Trichloroethylene solvent, a nylon brush, and
R rags, remove all evidence of dirt or grease from all
R accessible surfaces of the shock strut piston clevis
R lugs on both main landing gears (Ref. Fig. 602). Wipe
R the washed surfaces with clean, lint free cloths to
R assure that no residue remains on the painted surfaces
R that might compromise the result of the visual
R inspection.

R (2) Using a ten power magnifying glass and a strong light,
R inspect all accessible surfaces in area of shock strut
R piston clevis lugs, paying particular attention to the
R surfaces contiguous to the upper half of the pivot pin
R journal bushing flanges and web area immediately above.

R (3) If a crack is detected, remove and replace the
R respective MLG shock strut (Ref. 32-11-02).

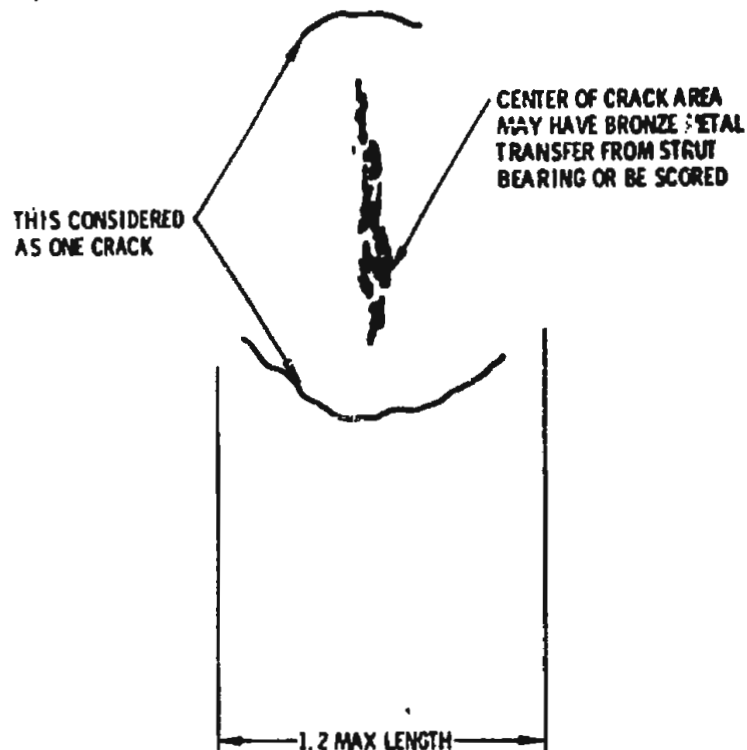
R (4) Lubricate MLG shock strut pivot pin journals and MLG
R truck beam pivot pin journals (Ref. 12-24-01).

0058 EFFECTIVITY: ALL

32-11-02

Page 602
Aug 15/82

LOCKHEED
 MAINTENANCE MANUAL



SMILE/FROWN CRACKS NORMALLY OCCUR
 IN LOWER 12 INCHES OF PISTON CHROME

M1-0000-32-2911

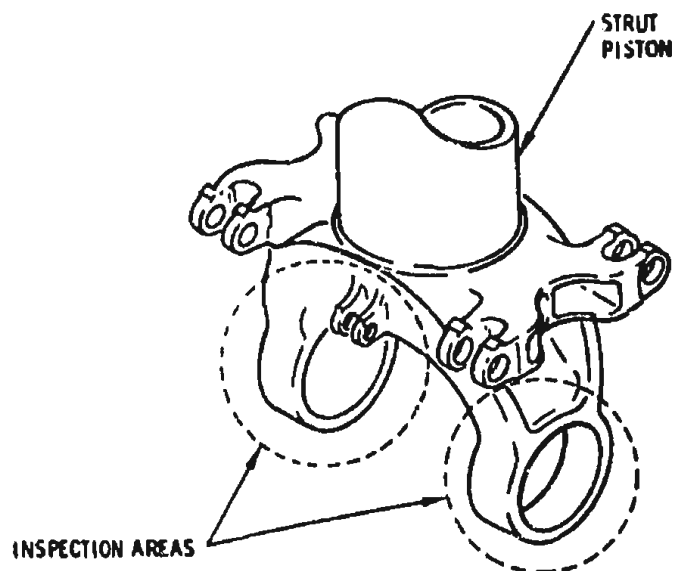
Typical Crack
 Figure 601

C
 C
 R
 R
 0058

EFFECTIVITY: ALL

32-11-02
 Page 603
 Aug 15/82

LOCKHEED
MAINTENANCE MANUAL



MI-0000-32-771

MLG Shock Strut Piston Lugs Inspection/Check
Figure 602

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EFFECTIVITY: ALL

32-11-02
Page 604
Aug 15/82

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR SHOCK STRUT - APPROVED REPAIRS

1. General

This section describes the approved methods of repair of the main landing gear (MLG) shock strut consisting of:

Removal of Active Seals (Para. 4A)

Replacement of Active Dynamic Seal (Para. 4B)

Replacement of Active Static Seal (Para. 4C)

Installation After Replacement of Active Seals (Para. 4D)

Removal and Installation of Active and Spare Seals (Para. 4E)

2. Equipment and Materials

R Hydraulic Fluid, Ref. MM 12-14-12, Servicing Main Gear Shock
R Strut

R Grease, Ref. MM 12-20-00, Lubrication, Scheduled Servicing

MLG Strut Lifting Bar, Menasco Mfg. Co., PN
MIST-1523103-113-1-1, or equivalent

Hydraulic Line Protective Caps and Plugs

Low Adhesion Sealing Compound, LAC Spec. C-40-769, Type I, or
equivalent

Hard Fiber Blocks, 1/2 inch by 1 inch, 12 inches long, or
equivalent

Seal Replacement Tool Set, PN B705, or equivalent

Cotter Pin, MS24665-153, or equivalent

Tie Strap, Nylon, or equivalent

Screws, two, 1/4-28, 2 inches long, or equivalent

Jacks, Scissors, or equivalent

Three (3) lb. rubber mallet

Lock-wire, Fed Spec QQ-W-390, 0.032-inch diameter, or equivalent

EFFECTIVITY: ALL

32-11-02
Page 801
May 15/85

LOCKHEED
MAINTENANCE MANUAL

3. Referenced Procedures

- | | | |
|---|----------|---|
| | 7-11-00 | Wing and Fuselage Jacking - Maintenance Practices |
| | 12-14-12 | Main Landing Gear Strut - Servicing |
| | 20-00-03 | Sealing of Threaded Steel Joints for Corrosion Protection - PB75-484A |
| R | 31-41-00 | Weight and Balance System Computer Indicator - Adjustment and Test |
| R | 32-11-02 | Main Landing Gear Shock Strut Assembly - Removal and Installation |
| | 32-30-00 | Landing Gear Retraction and Extension - Adjustment and Test |
| R | 32-33-00 | Main Landing Gear Inboard Door - Maintenance Practices |
| R | 32-43-00 | Main Landing Gear Brake System - Maintenance Practices |
| | 32-44-00 | Antiskid Control System - Adjustment and Test |

4. Approved Repairs

A. Removal of Active Seals

- R
- (1) Open both MLG inboard doors and install MLG inboard door actuator locks (Ref. 32-33-00).
 - (2) Jack aircraft until all MLG wheels are clear of ground. Lower aircraft until MLG strut extension is approximately 15 inches (Ref. 7-11-00). Install NLG and MLG downlock safety pins.

NOTE: Jacking aircraft until wheels are clear of ground relieves side loads on strut so that when adapter and bearing are removed, there will be a minimum loss of concentricity (centering of piston in cylinder bore).

WARNING: AIR OR NITROGEN CHARGE MUST BE REDUCED TO ZERO BEFORE DISASSEMBLING SHOCK STRUT.

- (3) Release air or nitrogen charge from shock strut by removing dust cap on charging valve and turning upper nut on valve assembly three to four turns counterclockwise.

EFFECTIVITY: ALL

001B

32-11-02
Page 802
Aug 15/82



MAINTENANCE MANUAL

- (4) Place a container below shock strut to collect hydraulic fluid that will drain when lower bearing adapter is removed.
- (5) At lower end of cylinder, remove bolts and washers that attach three segments of split retainer to retainer ring. Slide retainer ring, scraper retainer, and scraper downward on piston. If retainer ring does not release easily, screw 1/4-28 bolts, two inches long, into retainer ring. Continued tightening of these bolts will jack retainer ring away from split retainer (Ref. Fig. 801). Remove bolts.
- (6) Disengage and remove three segments of split retainer from internal recess at bottom of cylinder.
- (7) Assemble tool set lower bearing seal puller in place with all knurled screws fully engaged into threaded puller holes in bearing adapter (Ref. Fig. 802).

WARNING: DO NOT APPLY ANY FORCE ON SEAL CHANGE PULLER FLANGES TO WITHDRAW BEARING OR BEARING ADAPTER UNLESS KNURLED SCREWS ARE FULLY ENGAGED IN THREADED HOLES.

- (8) Using two 3-pound rubber mallets, strike puller flanges simultaneously 180 degrees apart to move adapter downward until it is exposed. Move adapter down on strut as far as possible and remove puller from adapter.
- (9) Install tool set seal replacement collar assembly inside lower section of shock strut cylinder and, using knurled knobs, expand collar so that it is held in place inside cylinder.
- (10) Install puller assembly above adapter in position to pull bearing down. Ensure that knurled puller screws are fully engaged into threaded puller holes in bearing.
- (11) Observe caution preceding Step (8) and move lower bearing out of cylinder. Strike mallet blows simultaneously 180 degrees apart. If unable to remove lower bearing proceed as follows:
 - (a) Verify that aircraft is wing jacked, piston is fully extended, and wheels approximately three inches from ground.

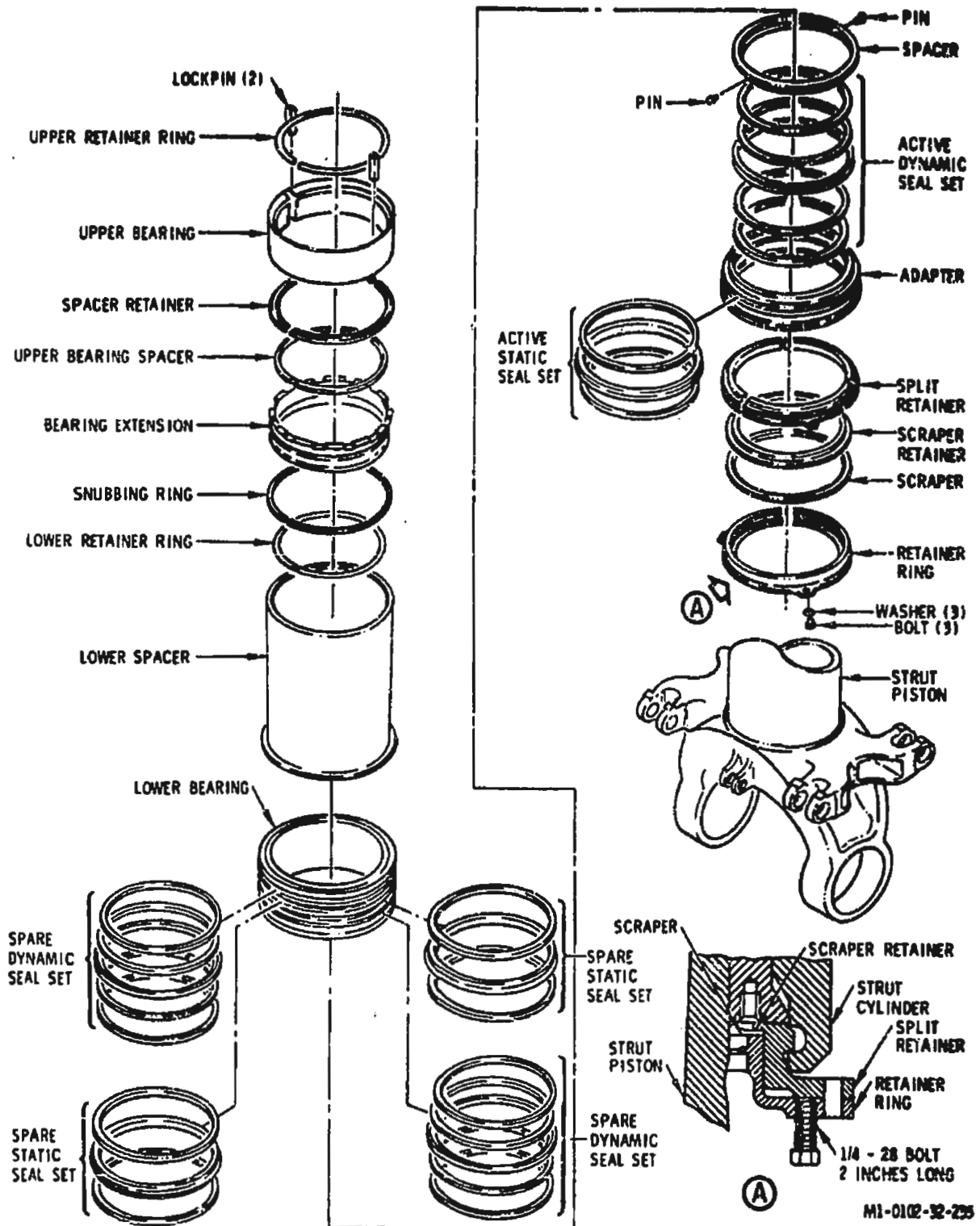
EFFECTIVITY: ALL

001B

32-11-02

Page 803
Nov 15/84

LOCKHEED
MAINTENANCE MANUAL



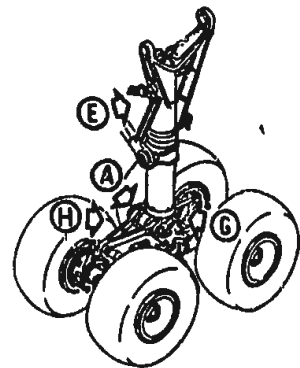
Shock Strut Seal Exchange Component Locations
Figure 801

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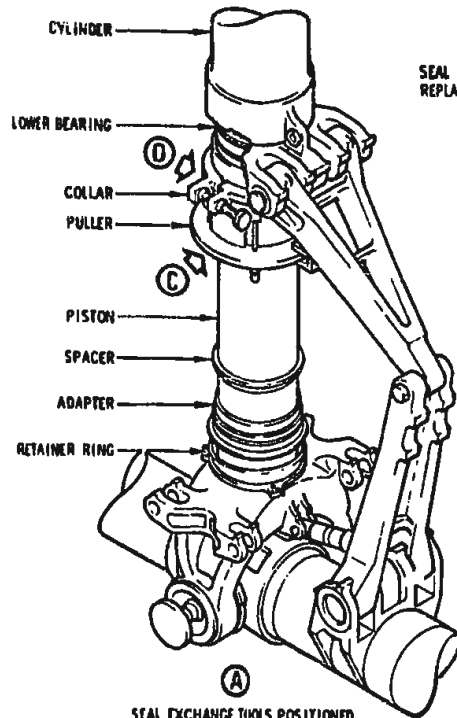
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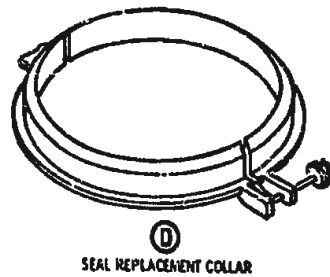
32-11-02
Page 804
May 15/75



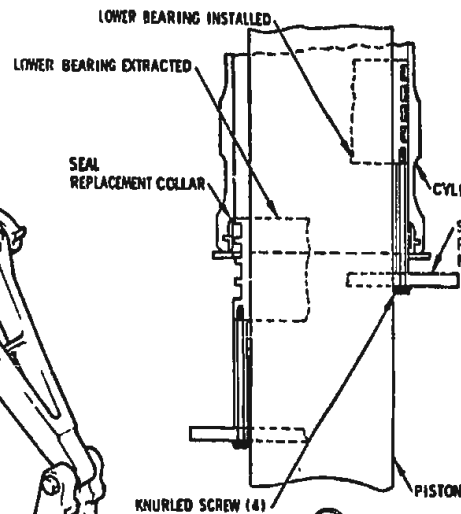
MAIN LANDING GEAR
ZONE 734, 741



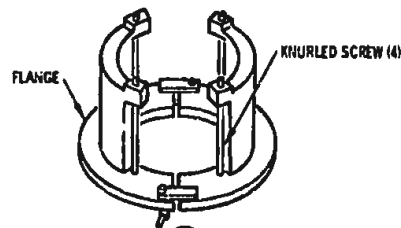
SEAL EXCHANGE TOOLS POSITIONED
FOR REMOVAL OF LOWER BEARING



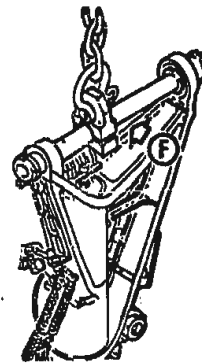
SEAL REPLACEMENT COLLAR



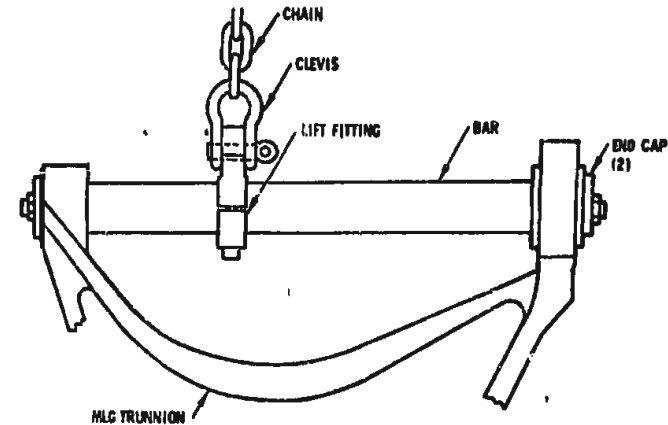
KNURLED SCREW (4)



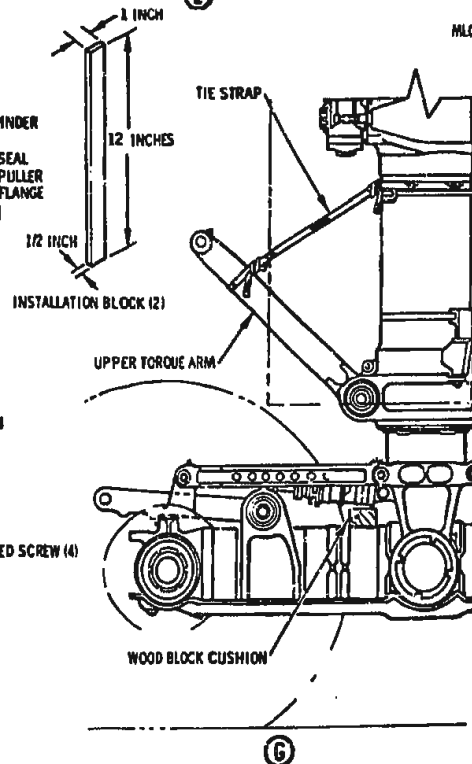
LOWER BEARING SEAL PULLER



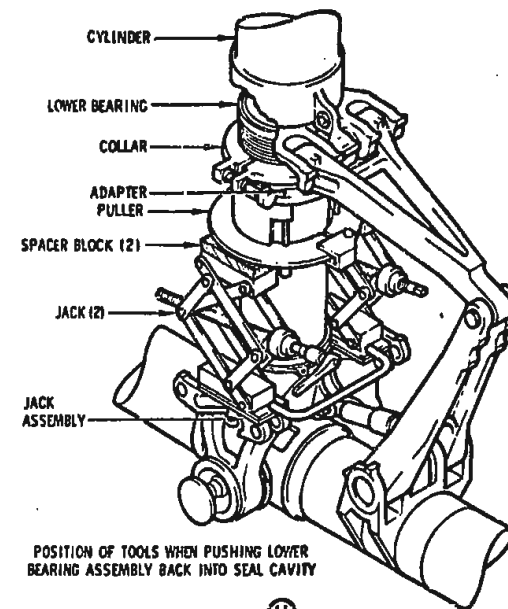
E



F



G



POSITION OF TOOLS WHEN PUSHING LOWER
BEARING ASSEMBLY BACK INTO SEAL CAVITY

H

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Shock Strut Seal Exchange Tools
Figure 802

EFFECTIVITY: ALL

32-11-02
Page 805/806
May 15/75

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001B

LOCKHEED
MAINTENANCE MANUAL

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- (b) Use hydraulic jack to apply force between piston brake link lugs and cylinder torque link lugs, and push piston out of cylinder.
- (12) Remove puller.
- (13) Remove bearing spacer from seal adapter by removing retaining pins (Ref. Fig. 803). Slide bearing spacer out of work area.
- (14) Remove old backup rings and dynamic seal from groove with a hooked tool. Cut old seal to remove from around piston.
- (15) Remove backup rings and cut static seal from groove, as required.

B. Replacement of Active Dynamic Seal

- (1) Flush adapter seal grooves with clean hydraulic fluid.
- (2) Carefully remove a spare dynamic seal and backup ring set from carrier groove in bearing. Avoid stretching backup rings and seal.

NOTE: Backup rings are removed with minimum stretching by pulling each ring into a spiral, rotating ring into a vertical plane, and withdrawing ring from position.

Dynamic seals have four backup rings. Static seals have two backup rings (Ref. Fig. 803).

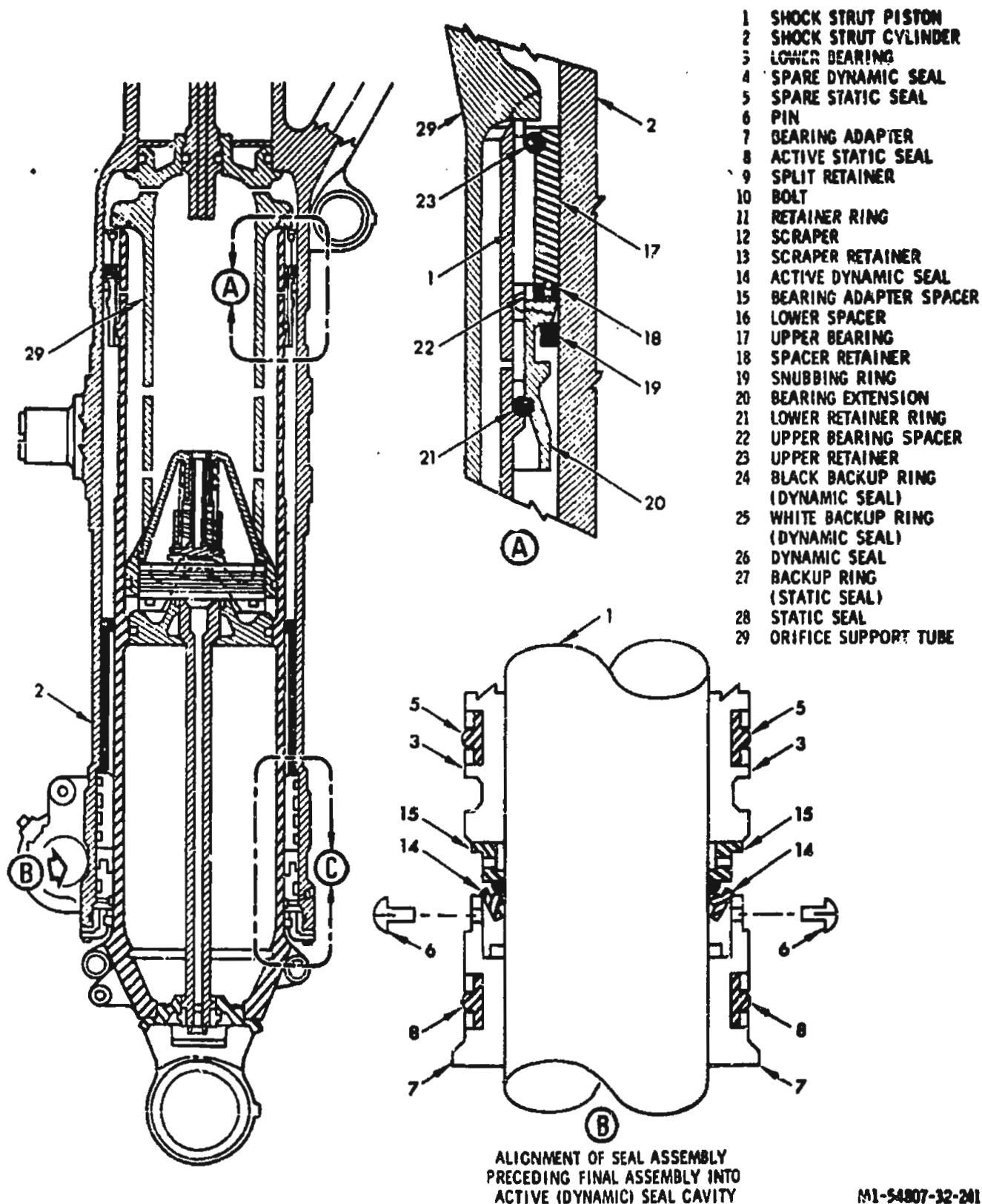
- (3) Preload backup rings by circumferentially overlapping ends about 3 inches to make sure backup rings hug piston with zero clearance.
- (4) Place lower backup ring (black) in groove first, and then white backup ring with radius next to rubber (Ref. Fig. 803). Rotate scarf cuts to place them 180 degrees apart.
- (5) Ensure that there is no gap between bottom backup ring and shock strut piston. Coat seal with hydraulic fluid and place edge of seal flange into groove. Do not attempt to stuff seal into groove at this time.
- (6) Work lower flange of seal into groove by rapidly running hands around edge until seal is into the groove approximately to center of seal cross section (Ref. Fig. 803). The seal will be cocked in an angular position to piston. It should be evenly positioned all

EFFECTIVITY: ALL

32-11-02
Page 807
Nov 15/84

001B

LOCKHEED
MAINTENANCE MANUAL



M1-54807-32-201

Shock Strut Seal Exchange Installation
Figure 803 (Sheet 1)

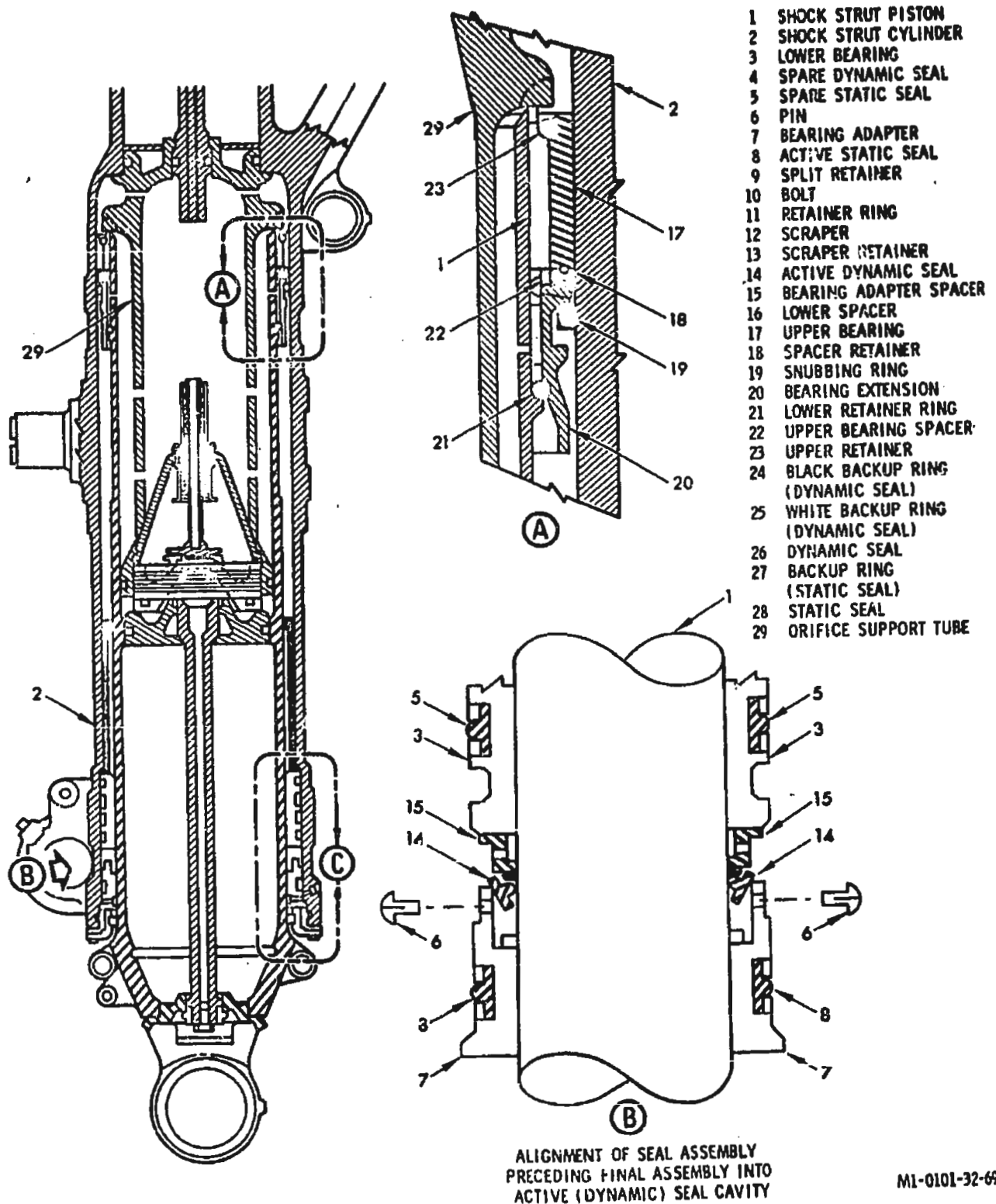
EFFECTIVITY: 001-031 WITHOUT SB32-073

32-11-02
Page 808
Aug 15/77

001B

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LOCKHEED
MAINTENANCE MANUAL



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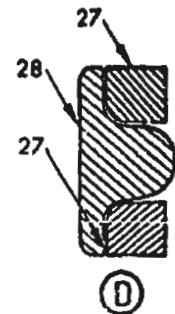
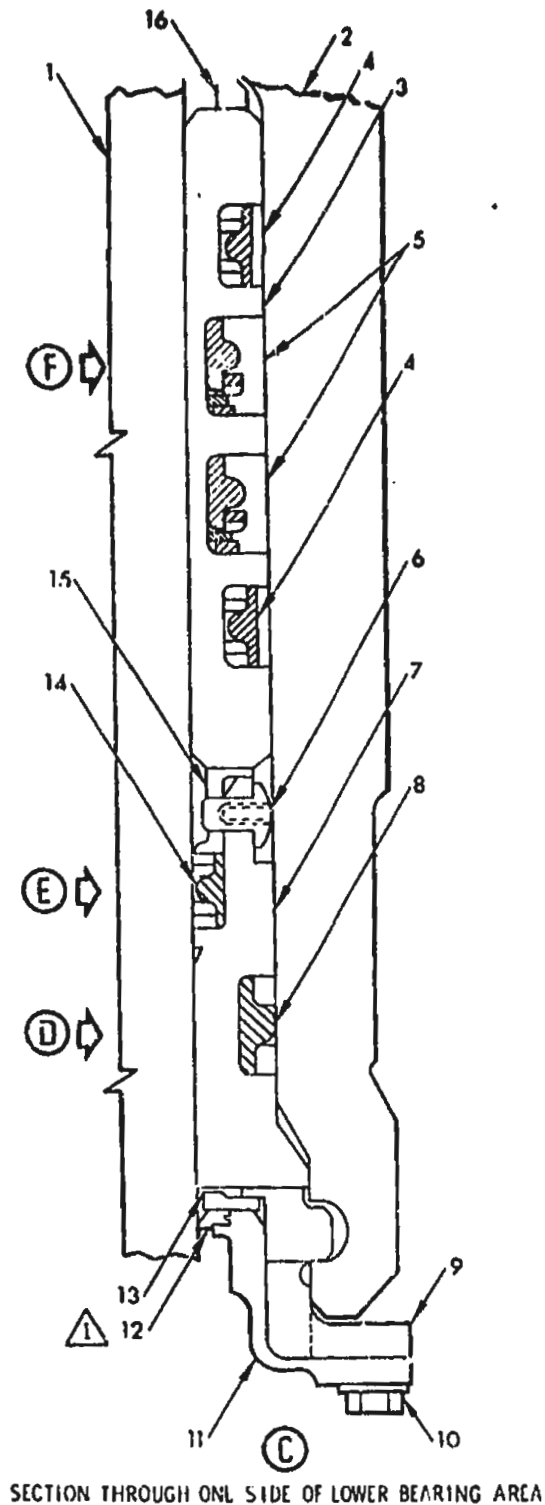
Shock Strut Seal Exchange Installation
Figure 803 (Sheet 1)

EFFECTIVITY: 001-031 WITH SB32-073 AND 032-999

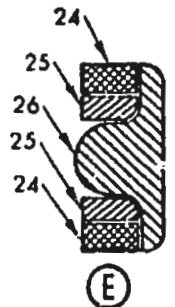
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32-11-02
Page 809
Aug 15/77

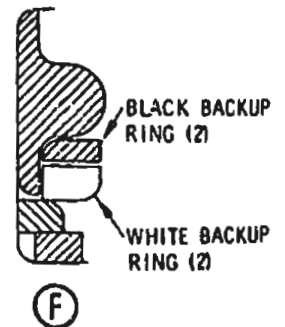
LOCKHEED
MAINTENANCE MANUAL



STATIC SEAL ASSEMBLY



DYNAMIC SEAL ASSEMBLY



SPARE DYNAMIC SEAL ASSEMBLY

NOTE
SCRAPER MUST BE INSTALLED WITH FLAT SIDE UP AND SCRAPER RETAINER MUST BE INSTALLED WITH FLAT SIDE DOWN

M1-0002-32-299

Shock Strut Seal Exchange Installation
Figure 803 (Sheet 2)

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001B

32-11-02
Page 810
Nov 15/89



the way around, with no part of the edge deeper than another. Do not allow seal to work back out of groove.

- (7) Install upper backup rings, white ring in place (radius down) against the seal, Position the black ring on top with scarf cut rotated 180 degrees from white ring scarf cut. Upper backup rings should fit concentrically, but should not hug the strut.
- (8) Move bearing spacer down on top edge of backup rings and seal assembly. Use bearing as a sliding hammer to apply sharp blows to spacer until spacer is completely seated. Remove spacer and inspect backup rings to ensure that scarf overlap is correct and that scarfs are positioned 180 degrees apart. Install spacer and insert retaining pins.
- (9) Install bearing spacer retaining pins.

C. Replacement of Active Static Seal

- (1) Flush adapter seal groove with clean hydraulic fluid.
- (2) Carefully remove a spare static seal and backup ring set from carrier groove in bearing. Slide seal into place in adapter groove with a minimum of stretching.

NOTE: Backup rings are removed with minimum stretching by pulling each ring into a spiral, rotating ring into a vertical plane, and withdrawing ring over bearing.

- (3) Install backup rings with radius next to seal (Ref. Fig. 803).

D. Installation after Replacement of Active Seals

- (1) Flush shock strut piston, lower bearing, and adapter with hydraulic fluid.
- (2) Ensure that MLG seal replacement collar assembly is firmly installed in bottom of shock strut cylinder (Ref. Fig. 802).
- (3) Slide lower bearing upward as far as possible. If necessary, install seal change puller to bearing and move bearing upward with blows (180 degrees apart) with rubber mallets against seal change puller flange. Remove puller.
- (4) Remove seal replacement collar.

R EFFECTIVITY: ALL

001B

32-11-02

Page 811
Nov 15/89

LOCKHEED
MAINTENANCE MANUAL

- (5) Slide adapter upward as far as possible.
- (6) Install seal change puller to adapter. Install lower seal change jack under puller, and jack up adapter and lower bearing as far as possible.
- (7) Remove jacks and seal change puller.

CAUTION: RETAINER MUST BE INSTALLED WITH RIDGED SIDE UP, TO PREVENT DAMAGE TO SCRAPER.

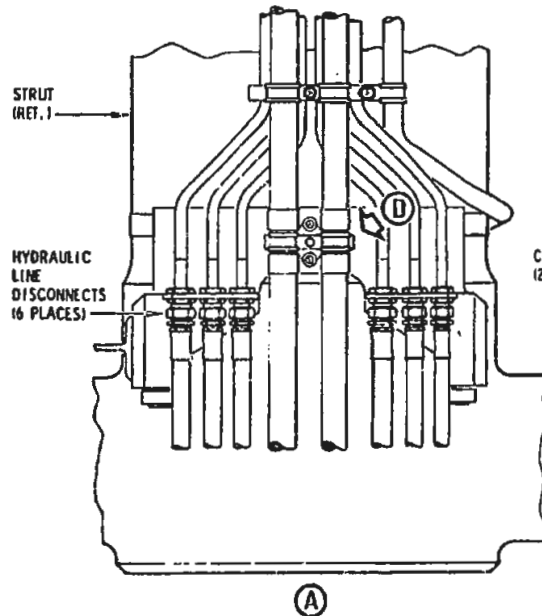
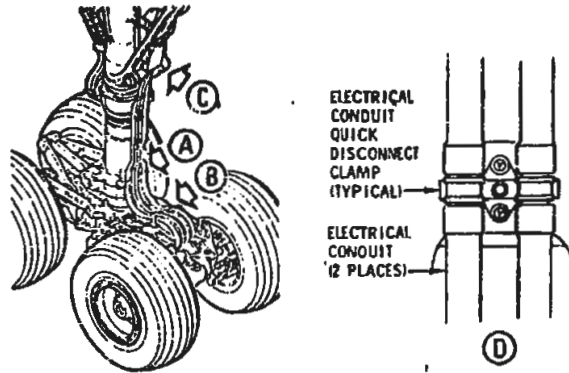
- (8) Install three split retainer segments.
- (9) Position scraper retainer (ridged side up) and scraper (flat side up) on retainer ring and slide up into cylinder.
- (10) Align bolt holes and install bolts into split retainer segments.
- (11) Safety bolts with lock-wire.
- (12) Service shock strut (Ref. 12-14-12).
- (13) Lower aircraft jacks (Ref. 7-11-00).
- (14) Remove MLG inboard door actuator locks and close doors (Ref. 32-33-00).

E. Removal and Installation of Active and Spare Seals

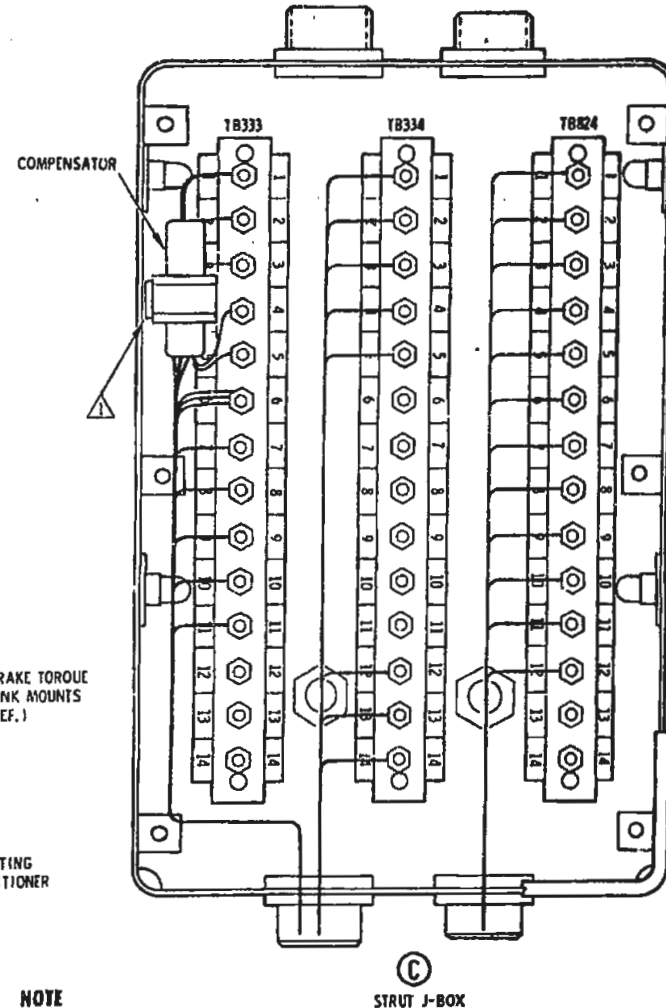
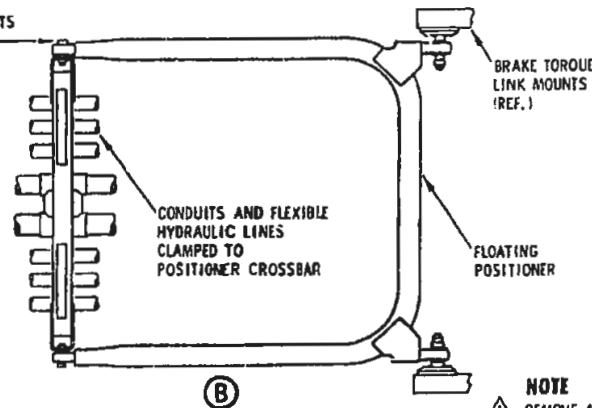
- (1) Remove main landing gear (Ref. 32-11-02).
- (2) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker BRAKE TEMP IND DC (G19) and AC (G20), BRAKE ANTISKID (F22), GEAR TRUCK LEVEL (F16), and FLIGHT STATION MISC WEIGHT & BAL - AC (F5) and DC (F6). On aft circuit breaker panel CB3, open and tag 5 VAC FLT ENGR PANEL LIGHTS - LOWER - NO. 2 (CC17).
- (3) Open strut J-box (Ref. Fig. 804).
- (4) Disconnect wiring leading to conduits at bottom of J-box.
- (5) Disconnect conduits from J-box.
- (6) Remove conduits from quick-disconnect clamps along strut.

R EFFECTIVITY: ALL
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001B

32-11-02
Page 812
Nov 15/89



TERMINAL STRIP	TERMINAL NUMBER	WIRE NUMBER
TB333	1	3263-7D18 (RED)
TB333	2	3263-8D18 (BLUE)
TB333	3	3263-9C18N (YELLOW)
TB333	4	3245-16E20
TB333	5	3245-15E20
TB333	6	3245-11AP18 (SHIELD)
TB333	6	3245-11AR18 (SHIELD)
TB333	6	3245-11AS18 (SHIELD)
TB333	7	3245-11AQ18 (SHIELD)
TB333	8	3245-14E18
TB333	9	3245-17E18
TB333	10	3245-13E18
TB333	11	3245-12E18
TB334	1	3261-40D18 (RED)
TB334	2	3261-41D18 (BLUE)
TB334	3	3261-37D18 (RED)
TB334	4	3261-38D18 (BLUE)
TB334	5	3261-39H18 (YELLOW)
TB334	12	2217-119A (BLUE)
TB334	13	2217-120A (RED)
TB334	14	2217-121A (YELLOW)
TB824	1	3244-28A20 (BLUE)
TB824	2	3244-29A20 (RED)
TB824	3	3244-53W18 (SHIELD)
TB824	4	3244-23A20 (RED)
TB824	5	3244-22A20 (BLUE)
TB824	6	3244-53A18 (SHIELD)
TB824	7	3244-27A20 (RED)
TB824	8	3244-26A20 (BLUE)
TB824	9	3244-53P18 (SHIELD)
TB824	10	3244-25A20 (RED)
TB824	11	3244-24A20 (BLUE)
TB824	12	3244-53G18 (SHIELD)



NOTE
REMOVE AND OPEN CLAMP. REMOVE COMPENSATOR AND WIRES FROM CLAMP

M1-0002-32-216

Strut Electrical and Hydraulic Disconnects
Figure 804

EFFECTIVITY: ALL

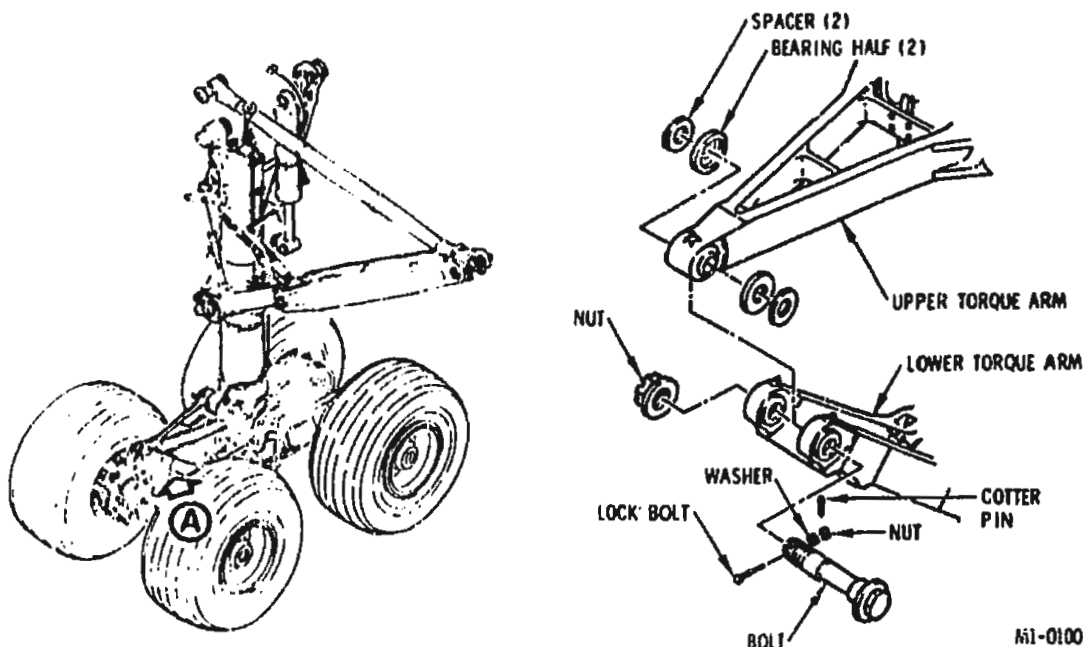
32-11-02
Page 813/814
Dec 15/94



- (7) Disconnect flexible hydraulic lines from rigid hydraulic lines. Cap and plug all lines.
- (8) Remove bolts securing common hydraulic line and conduit bracket to floating positioner and disconnect bracket.
- (9) Coil conduits and hydraulic lines and secure to truck beam.
- (10) Disconnect torque arms at apex as follows:

CAUTION: BEARING HALF POSITIONS AND SPACER MUST BE MAINTAINED DURING INSTALLATION. NOTE POSITION OF BEARING HALFS AND MARK FOR RETURN TO THAT POSITION.

- (a) Remove lock bolt from apex pin nut and remove nut (Ref. Fig. 805).
- (b) Remove bolt.
- (c) Separate upper torque arm from lower torque arm. Remove and tag bearing halves and spacers for reinstallation. Bearing halves and spacers must be reinstalled in original locations.



Alt-0100-32-522

Torque Arm Disconnect
Figure 805

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EFFECTIVITY: ALL

32-11-02
Page 815
Nov 15/89



MAINTENANCE MANUAL

- (d) Rest lower torque arm on wooden block on truck, and secure upper torque arm securely to strut cylinder (Ref. Fig. 802).
- (11) Place a container beneath shock strut to collect hydraulic fluid that will drain when strut cylinder is removed.
- (12) Install MLG strut lifting bar through trunnion bearings (Ref. Fig. 802) and connect bar to chain hoist to move strut cylinder upward approximately 15 inches.
- (13) Maintain cylinder in this position while performing Steps (14) and (15).
- (14) At lower end of cylinder, remove bolts and washers that attach retainer ring to split retainer. Slide retainer ring, scraper, and scraper retainer downward on piston. If retainer ring does not release easily, screw 1/4-28 bolts, 2 inches long, into retainer ring threaded holes. Continued simultaneous tightening of bolts will jack retainer ring away from split retainer (Ref. Fig. 801). Remove bolts.
- (15) Disengage and remove three segments of split retainer from internal recess at bottom of cylinder.

CAUTION: AS CYLINDER IS LIFTED OFF PISTON, LOWER BEARING ADAPTER, LOWER BEARING, AND LOWER SPACER WILL BE FORCED OUT OF CYLINDER WHEN SPACER BEARS AGAINST UPPER BEARING EXTENSION.

- (16) Lift strut cylinder until cylinder is clear of piston. Catch lower bearing adapter, lower bearing, and lower spacer if assembly has a tendency to slide down piston.
- (17) Tilt lower spacer to allow trapped fluid to escape.
- (18) At piston upper bearing, remove spacer retainer and spacer (Ref. Fig. 803).
- (19) Slide upper bearing down onto bearing extension.
- (20) Remove upper retainer ring.
- (21) Slide upper bearing upward off piston. Remove both keys.
- (22) Slide bearing extension with snubbing ring upward off piston.
- (23) Remove lower retainer ring.

R EFFECTIVITY: ALL

001B

32-11-02
Page 816
Nov 15/89



MAINTENANCE MANUAL

- (24) Slide lower spacer, lower bearing, and lower bearing adapter upward off piston.
- (25) Remove spare static and dynamic seals from lower bearing.
- (26) Pull pins and separate bearing adapter spacer from adapter.
- (27) Remove active static and dynamic seals from adapter. Discard all spare and active seals.
- (28) Install new active dynamic seals, with correctly positioned backup rings (Ref. Fig. 803), in adapter. Rotate backup ring scarf cuts to place them 180 degrees apart.
- (29) Mate bearing adapter spacer to adapter and secure with pins.
- (30) Install active static seal. Stretch seal as little as possible.
- (31) Install spare dynamic and static seals, with correctly positioned backup rings, in lower bearing.
- (32) Remove scraper and install new scraper over piston with ridged side down. Ensure that scraper retainer is positioned with ridged side up.
- (33) Slide lower bearing adapter assembly, lower bearing, and lower spacer downward onto piston.
- (34) At upper end of piston, install retainer ring in lower groove.
- (35) Install bearing extension.
- (36) Install upper bearing and keys. Slide bearing down onto bearing extension.
- (37) Install upper retainer ring.
- (38) Slide bearing upward to bear against upper retainer ring.
- (39) Install upper bearing spacer and spacer retainer. Position gap in spacer so it does not align with (90 degrees from) either key.
- (40) Lightly lube upper bearing assembly with hydraulic fluid.

R EFFECTIVITY: ALL

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001B

32-11-02

Page 817
Nov 15/89

- (41) Support lower bearing adapter, bearing, and lower spacer on two blocks (Ref. Fig. 802).
- (42) Position cylinder above piston so that cylinder is aligned with piston. Cylinder must be supported as near vertical as possible.
- (43) Lower cylinder slowly until lower spacer, lower bearing, and bearing adapter are seated home in cylinder.
- (44) Install one split retainer segment in cylinder recess.
- (45) Remove blocks and install remaining two segments.

CAUTION: SCRAPER RETAINER MUST BE INSTALLED WITH RIDGED SIDE UP TO PREVENT DAMAGE TO SCRAPER.

- (46) Verify that scraper retainer ridged side is up, and slide scraper (flat side up), scraper retainer, and retainer ring upward into cylinder (Ref. Fig. 803).
- (47) Position retainer ring up against split retainer segments and install bolts and washers.
- (48) Safety bolts with lock-wire.
- (49) Align upper and lower torque arms (Ref. Fig. 805).
- (50) Lubricate nut bearing surface, bolt bearing surfaces, spacers, and all bearing surfaces with grease.
- (51) Coat bolt threads with environmental seal (Ref. 20-00-03).
- (52) Position bearing halves and spacers in original position with aligned torque arms and install bolt.
- (53) Tighten nut to remove end play and allow lock bolt to be installed. Install washer and nut. Safety with cotter pin. Bolt must be free to rotate.
- (54) Position hydraulic lines and electrical conduits. Connect bracket to floating positioner (Ref. Fig. 804).
- (55) Remove caps and plugs, and connect flexible hydraulic lines to rigid hydraulic lines, ensuring that they have not crossed.
- (56) Position electrical conduits in quick-disconnect clamps and secure in place.

R EFFECTIVITY: ALL
R
001B

32-11-02
Page 818
Nov 15/89

LOCKHEED



MAINTENANCE MANUAL

- (57) Lead electrical wires through holes in J-box and connect conduits.
- (58) Connect electrical leads to J-box terminals.
- (59) Install main landing gear (Ref. 32-11-02).
- (60) Service shock strut (Ref. 12-14-12).
- (61) Perform applicable landing gear retraction and extension (Ref. 32-30-00).
- (62) Bleed normal and alternate brake systems (Ref. 32-43-00).
- (63) Verify that NLG and MLG downlock safety pins are installed.
- (64) Lower and remove jacks (Ref. 7-11-00).
- (65) Perform antiskid control system test (Ref. 32-44-00).
- (66) Perform on board weight and balance test (Ref. 31-41-00).
- (67) Install cover on strut J-box.

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EFFECTIVITY: ALL

32-11-02
Page 819/820
Nov 15/89

MAIN LANDING GEAR TRUCK - REMOVAL AND INSTALLATION**1. General**

R This procedure contains instructions for removed and
R installation of MLG truck. Removal and installation of either
R truck is identical and opposite.

2. Equipment and Materials

R Axle Jacks (2)

Jack Pad Adapters

Cotter Pin, MS24665-153, or equivalent

Low Adhesion Sealing Compound, LAC Spec C-40-769, Type II, or
equivalent

Forward Fuselage Jack

R Grease, Ref. MM 12-20-00, Lubrication, Scheduled Servicing Guide
Pin, Dwg No. 1523058-101-MST-1, or equivalent without SB32-154

Guide Pin, Dwg No. 1535937-101-MST-1, or equivalent with
SB32-154

Landing Gear Removal and Installation Fixture, Fansteel Model
1600, or equivalent

MLG Transport Dolly, Model 1601 and Boot Strap Hoist, PN
BG25-101

Lock-wire, Fed. Spec. QQ-W-390, 0.032-inch diameter, or
equivalent

MLG Bogie Pin Adapter Wrench, Dwg No. 1310788-101, or equivalent

MLG Truck Attachment Pin Torque Wrench Adapter, Dwg No.
1523003-MST-1, or equivalent

MLG Strut Lock, PN BC90, or equivalent

Protective caps and plugs

Wing Jack

EFFECTIVITY: ALL

001B

32-11-03
Page 401
May 15/85



3. Referenced Procedures

	7-11-00	Wing and Fuselage Jacking - Maintenance Practices
R	7-12-00	Axle Jacking - Maintenance Practices
	9-11-00	Normal Towing Conditions - Maintenance Practices
	12-14-12	Main Landing Gear Servicing
	20-51-04	Environmental Sealing of Model L-1011 Airplane (PB75-425)
	29-11-00	Hydraulic Power System - Maintenance Practices
	32-11-06	Main Landing Gear Uplock Snubber Assembly - Removal and Installation
	32-30-00	Landing Gear Retraction and Extension - Adjustment and Test
	32-33-00	Main Landing Gear Inboard Door - Maintenance Practices
	32-43-00	Main Landing Gear Brake System - Maintenance Practices
	32-61-08	Main Landing Gear Truck Unlevel Position Sensor - Adjustment and Test

4. Removal/Installation

A. Removal

- (1) Install right and left MLG and NLG downlock safety pins (Ref. 9-11-00).
- (2) Open applicable MLG door and install MLG door actuator lock (Ref. 32-33-00).
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R (3) Turn off hydraulic systems B and C pressure and depressurize Systems B and C reservoirs (Ref. 29-11-00).
- (4) Pump brake pedals until normal and alternate brake systems pressure is 0 psi.
- (5) At filler valve (top of strut), release air or nitrogen charge from shock strut by removing dust cap on charging valve and turning upper nut on valve assembly three to four turns counterclockwise.

EFFECTIVITY: ALL

001B

32-11-03
Page 402
May 15/85

LOCKHEED
MAINTENANCE MANUAL

When charge is down to 0 psi, remove charging valve from strut.

- (6) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breakers BRAKE TEMP IND DC (G19) and AC (G20), BRAKE ANTISKID (F22), and GEAR TRUCK LEVEL (F16).
- (7) Open strut J-box (Ref. Fig. 401).
- (8) Disconnect wiring leading to conduits at bottom of J-box (Ref. Fig. 402).
- (9) Disconnect conduits from J-box.
- (10) Remove conduits from quick-disconnect clamps along strut.
- (11) Disconnect flexible hydraulic lines from rigid hydraulic lines. Cap all hydraulic lines (Ref. Fig. 402).
- (12) Disconnect common hydraulic line and conduit bracket at floating positioner.
- (13) Coil conduits and hydraulic lines and secure to truck beam.
- (14) Disconnect brake torque links from strut. Rest torque links on a wooden block across truck.
- (15) Disconnect torque arms at apex as follows:
 - (a) Remove lock bolt from apex nut and remove nut.
 - (b) Support lower torque arm and upper torque arm to ensure that side loads are reduced to a minimum.

NOTE: Minimum side load is ensured when bolt can be rotated freely with little effort.

- (c) Remove bolt.

CAUTION: SPACERS MUST BE RETURNED TO SAME POSITIONS FROM WHICH THEY ARE REMOVED. PRIOR TO REMOVAL, MARK SPACERS FOR POSITION.

- (d) Separate upper torque arm from lower torque arm, and remove spacers and washers.

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001B

EFFECTIVITY: ALL

32-11-03
Page 403
May 15/85



MAINTENANCE MANUAL

- (e) Rest lower torque arm on wooden block on truck, and secure upper arm to MLG strut with tie strap (Ref. Fig. 403).
- (16) Disconnect truck positioner hydraulic lines. Cap and plug lines and fittings.
- (17) Disconnect truck positioner at strut. Rest positioner on a wooden block across truck.
- (18) Remove uplock snubber from truck attachment pin (Ref. 32-11-06).
- (19) If not already done, remove lock bolt from truck attachment pin nut.
- (20) Loosen attachment pin nut using the pin nut adapter. Use a spanner to prevent pin rotation.
- (21) Remove nut and washer.
- (22) Connect strut lock between MLG retract actuator lower attachment pin and brake torque link fitting below actuator fitting as follows:
- (a) Remove thru-bolt and caps from MLG actuator lower attachment pin.
 - (b) Secure upper end of strut lock to MLG actuator lower attachment pin.
 - (c) Secure lower end of strut lock to brake torque link attachment pin.
 - (d) Tighten strut lock turnbuckle until all play is taken up.

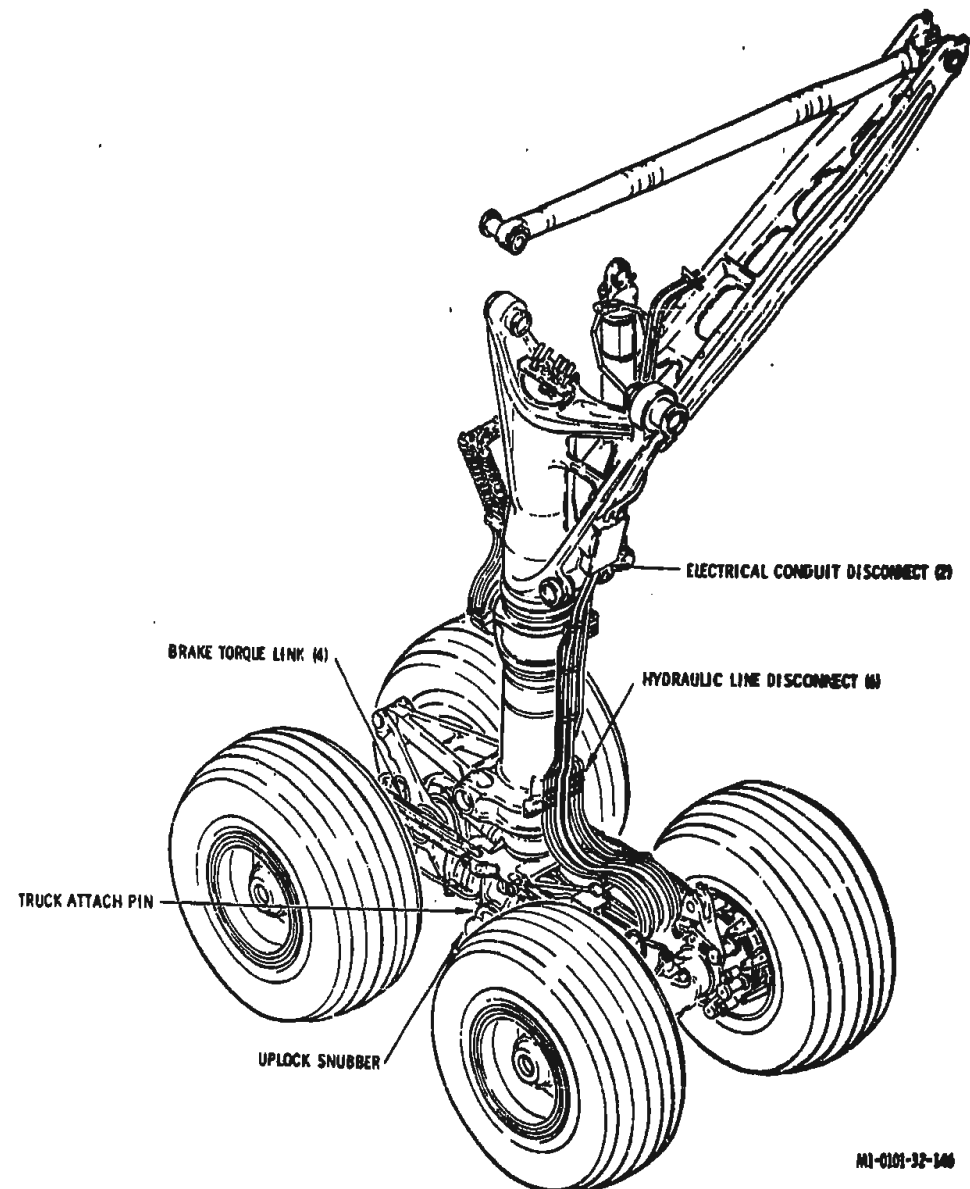
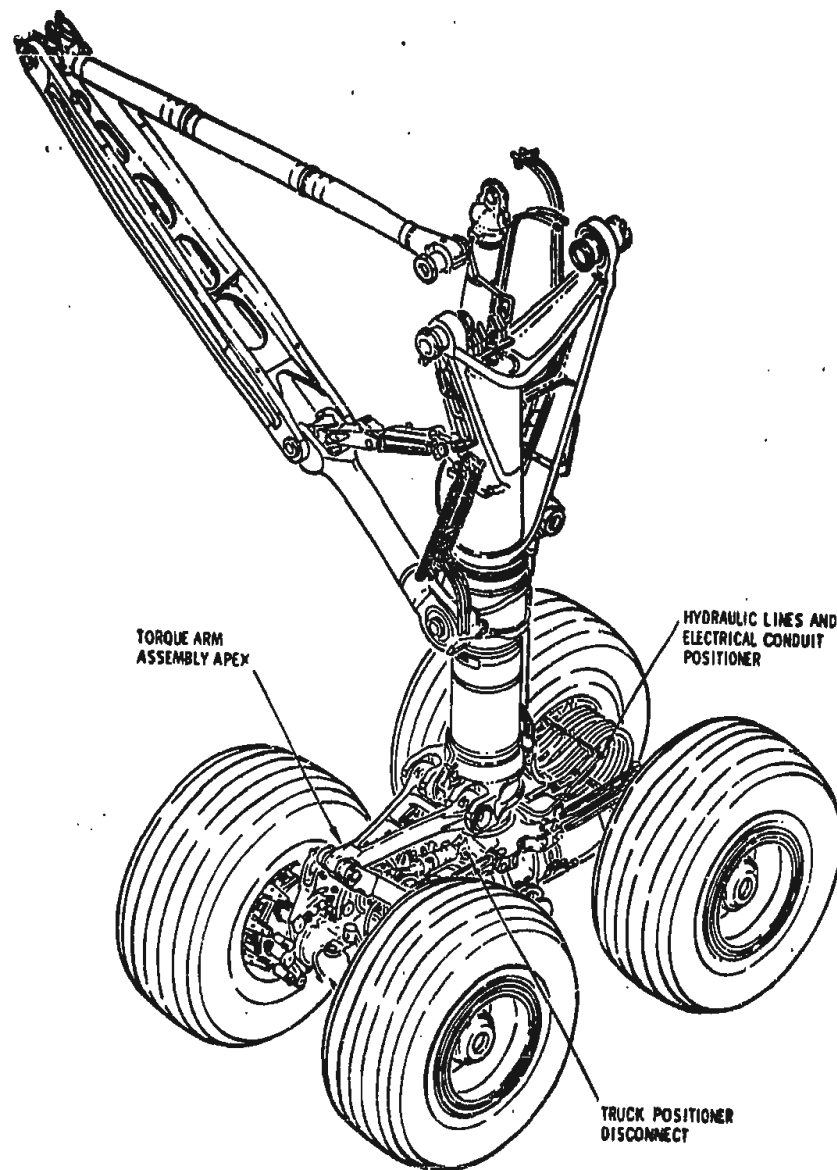
WARNING: STRUT CHARGING PRESSURE MUST BE 0 PSI AND VALVE MUST BE REMOVED PRIOR TO JACKING AIRCRAFT.

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- (23) Jack aircraft (Ref. 7-11-00) to a height that will just raise wheels clear of ground.
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- (24) Position two axle jacks under truck so that MLG truck so that MLG truck is resting on jacks with wheels checked.
- (25) Remove truck attachment pin as follows:
- (a) Ensure that minimum side loads exist on truck attachment pin.

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EFFECTIVITY: ALL

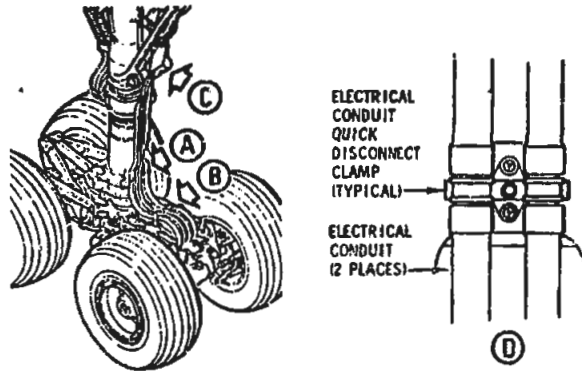
32-11-03
Page 404
May 15/85



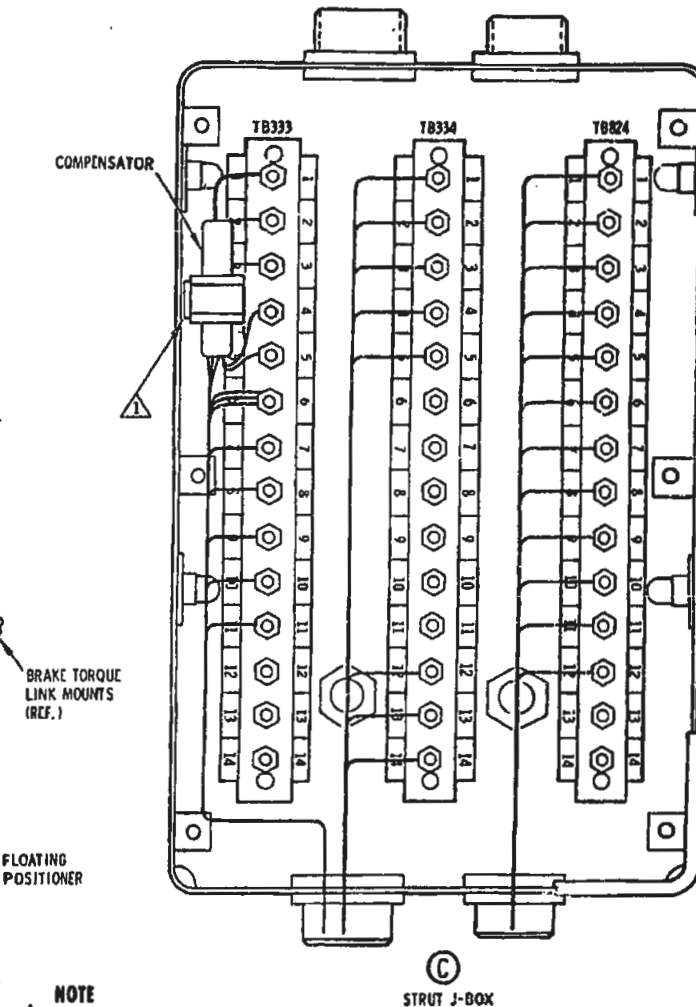
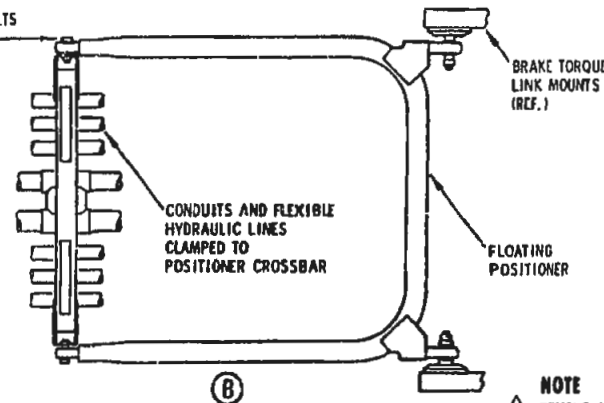
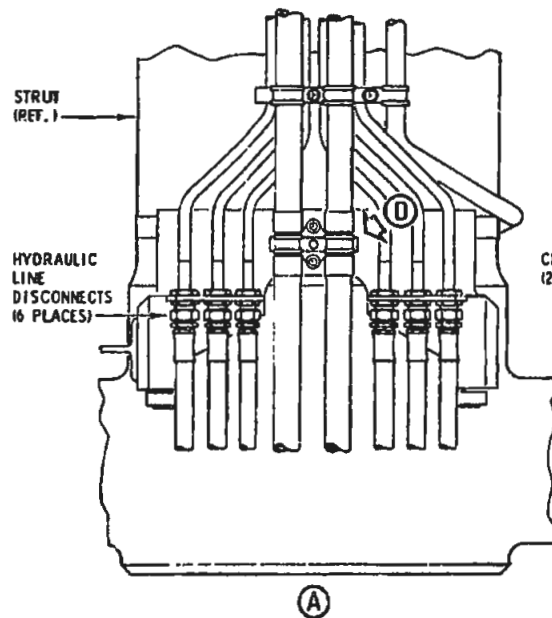
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Main Landing Gear Truck - Removal and Installation
Figure 401

LOCKHEED
MAINTENANCE MANUAL



TERMINAL STRIP	TERMINAL NUMBER	WIRE NUMBER
TB333	1	3243-7D18 (RED)
TB333	2	3243-8D18 (BLUE)
TB333	3	3243-9C18W (YELLOW)
TB333	4	3245-1M20
TB333	5	3245-1S20
TB333	6	3245-11AP18 (SHIELD)
TB333	6	3245-11AR18 (SHIELD)
TB333	6	3245-11AS18 (SHIELD)
TB333	7	3245-11AQ18 (SHIELD)
TB333	8	3245-1M18
TB333	9	3245-17E18
TB333	10	3245-13E18
TB333	11	3245-12E18
TB334	1	3261-40D18 (RED)
TB334	2	3261-41D18 (BLUE)
TB334	3	3261-37D18 (RED)
TB334	4	3261-38D18 (BLUE)
TB334	5	3261-39H18 (YELLOW)
TB334	12	2217-119A (BLUE)
TB334	13	2217-120A (RED)
TB334	14	2217-121A (YELLOW)
TB824	1	3244-28A20 (BLUE)
TB824	2	3244-29A20 (RED)
TB824	3	3244-53W18 (SHIELD)
TB824	4	3244-23A20 (RED)
TB824	5	3244-22A20 (BLUE)
TB824	6	3244-53A18 (SHIELD)
TB824	7	3244-27A20 (RED)
TB824	8	3244-26A20 (BLUE)
TB824	9	3244-53P18 (SHIELD)
TB824	10	3244-25A20 (RED)
TB824	11	3244-24A20 (BLUE)
TB824	12	3244-53G18 (SHIELD)



NOTE
REMOVE AND OPEN CLAMP. REMOVE COMPENSATOR AND WIRES FROM CLAMP

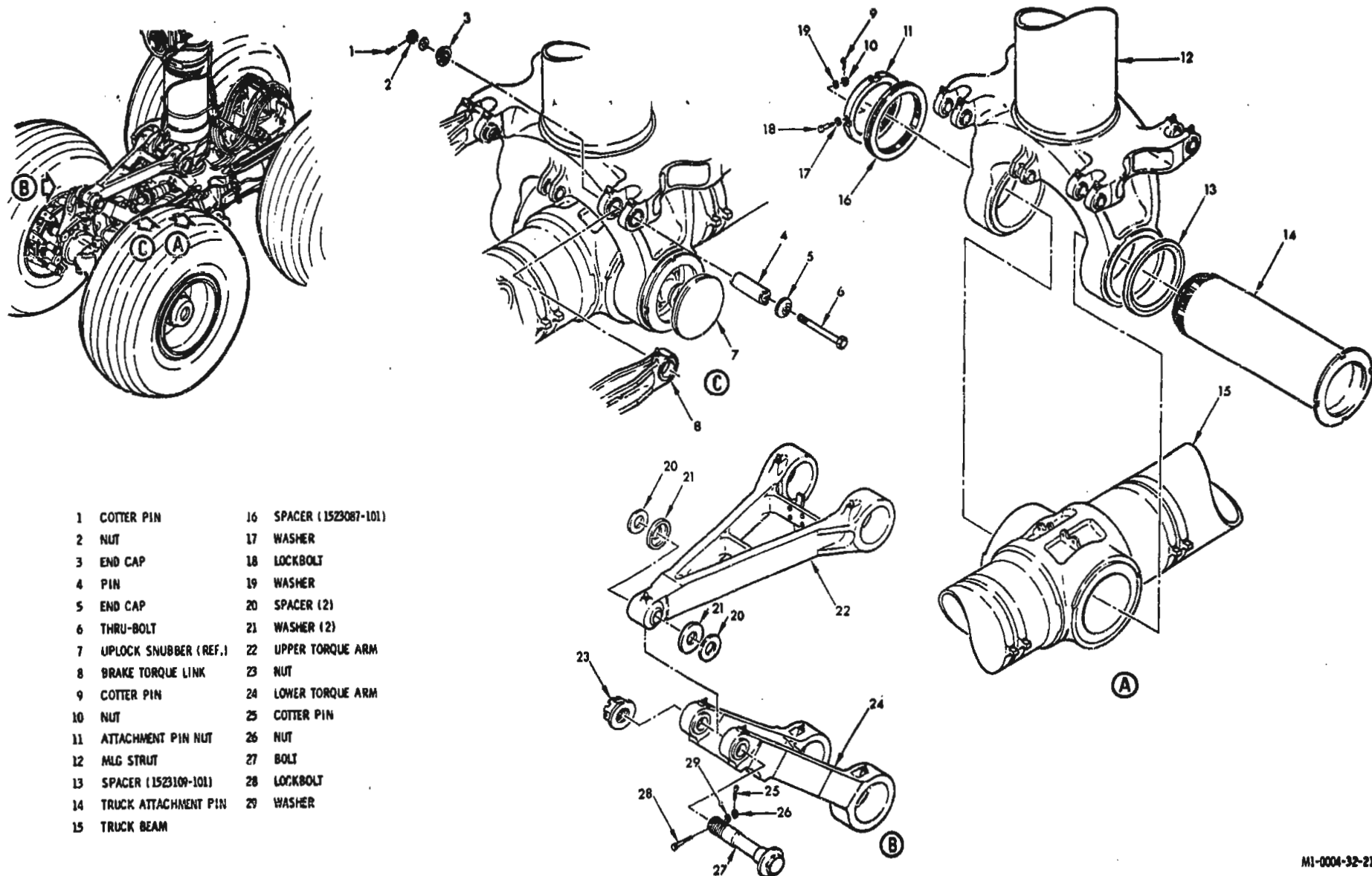
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Main Landing Gear Truck Removal Disconnects
Figure 402 (Sheet 1)

EFFECTIVITY: ALL

32-11-03
Page 407/408
Dec 15/94

001B



- | | |
|-------------------------|-------------------------|
| 1 COTTER PIN | 16 SPACER (1523087-101) |
| 2 NUT | 17 WASHER |
| 3 END CAP | 18 LOCKBOLT |
| 4 PIN | 19 WASHER |
| 5 END CAP | 20 SPACER (2) |
| 6 THRU-BOLT | 21 WASHER (2) |
| 7 UPLOCK SNUBBER (REF.) | 22 UPPER TORQUE ARM |
| 8 BRAKE TORQUE LINK | 23 NUT |
| 9 COTTER PIN | 24 LOWER TORQUE ARM |
| 10 NUT | 25 COTTER PIN |
| 11 ATTACHMENT PIN NUT | 26 NUT |
| 12 MLG STRUT | 27 BOLT |
| 13 SPACER (1523109-101) | 28 LOCKBOLT |
| 14 TRUCK ATTACHMENT PIN | 29 WASHER |
| 15 TRUCK BEAM | |

Main Landing Gear Truck Removal Disconnects
Figure 402 (Sheet 2)

32-11-03
Page 409/410
Nov 15/84

M1-0004-32-214

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EFFECTIVITY: ALL

001B

LOCKHEED
MAINTENANCE MANUAL

NOTE: Minimum side loads exist when truck attachment pin can be rotated freely with a spanner. It may be necessary to lower or raise the axle jacks to obtain this condition.

(b) Remove truck attachment pin.

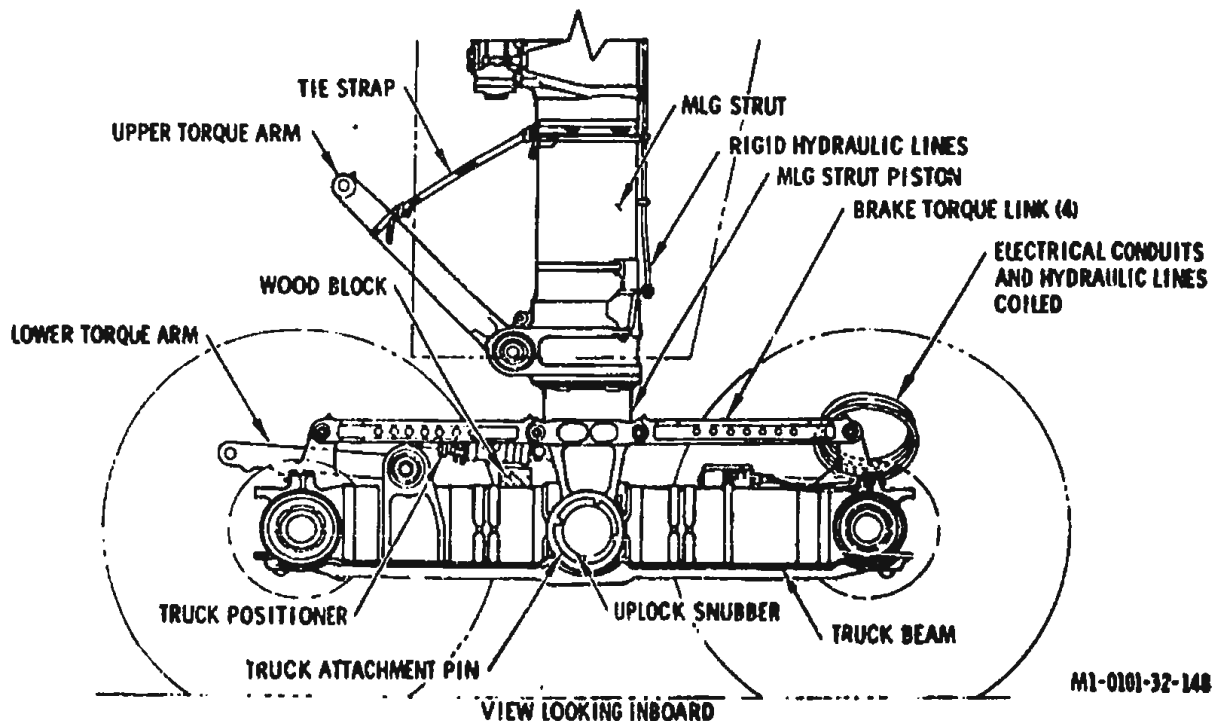
(26) Raise aircraft until strut piston clears all upper portions of truck assembly.

NOTE: If aircraft cannot be raised to height to clear truck use bootstrap rigging equipment to compress strut (Ref. 32-11-02).

(27) Roll truck assembly clear of MLG strut.

B. Installation

NOTE: Aircraft must be supported by wing and fuselage jacks high enough so that when the MLG strut is compressed and secured with the strut lock the strut will clear the truck assembly when truck is under the strut.



Main Landing Gear Truck Removal Component Security
Figure 403

EFFECTIVITY: ALL

32-11-03
Page 411
May 15/85

0018



MAINTENANCE MANUAL

CAUTION: ENSURE CORRECT PART NUMBER TRUCK IS BEING INSTALLED ON APPLICABLE AIRCRAFT. FAILURE TO DO SO COULD RESULT IN TRUCK DAMAGE.

- (1) Position truck assembly so that strut fork will fit over truck attachment pin bushings.
- (2) Using two axle jacks (Ref. 7-20-00), raise truck until strut fork fits over truck attachment pin bushings.

NOTE: When raising the truck into position ensure that the unlevel sensors are not damaged by contacting the sensor targets. Inspect the sensors for damage after truck attachment pin is installed.

- (3) Apply a coat of grease to strut and truck bushings.
- (4) Thread guide pin onto inboard side of truck attachment pin.

NOTE: Guide pin, aligns strut and truck bushing alignment during installation of truck attachment pin.

CAUTION: ENSURE APPLICABLE TRUCK ATTACHMENT PIN IS INSTALLED. FAILURE TO DO SO COULD RESULT IN PIN DAMAGE.

- (5) Coat 1523109-101 spacer with grease and install truck attachment pin.

NOTE: Guide pin is to be removed after truck attachment pin is inserted.

- (6) Coat 1523087-101 spacer with grease and install on truck attachment pin.
- (7) Lubricate threads and truck attachment pin nut bushing face with grease then install nut.
- (8) Torque nut to 100 ft-lb to obtain zero end play. Back off nut as required to align holes for installation of lock-bolt.

CAUTION: ENSURE APPLICABLE UPLOCK SNUBBER ASSEMBLY IS INSTALLED. FAILURE TO DO SO COULD RESULT IN ASSEMBLY DAMAGE.

- (9) Install uplock snubber assembly (Ref. 32-11-06).

EFFECTIVITY: ALL

32-11-03
Page 412
Nov 15/86

LOCKHEED
MAINTENANCE MANUAL

- (10) If not performed in Step 9; install lock-bolt, washer, and nut. Safety lock nut with cotter pin.
- (11) Insure truck attachment pin is free to rotate.
- (12) Coat truck positioner bolt, pin, bearings, and flange bearing surfaces with grease, and connect positioner to strut. Tighten nut and secure with a cotter pin.
- R (13) Remove axle jacks and align upper and lower torque arms with each other.
- (14) Lubricate bolt threads, nut bearing surface, bolt bearing surfaces, spacer, washer faces, and all bearing surfaces with grease. Install all components.
- (15) Tighten nut to remove end play. Increase torque until lock bolt can be installed. Install washer and nut, then safety with cotter pin. Bolt must be free to rotate without binding.

CAUTION: IF A FIBER INSERT NUT IS TO BE INSTALLED, IT MUST BE NEW.

- (16) Coat all bearing surfaces and threads with grease and connect brake torque links to brakes. Secure nuts with cotter pins.
- (17) Position hydraulic lines and electrical conduit, and connect bracket at floating positioner.
- (18) Connect flexible hydraulic lines to rigid hydraulic lines.
- (19) Position electrical conduits in quick-disconnect clamps and secure in place. Connect conduits to J-box.
- (20) Connect electrical leads in J-box (Ref. Fig. 402).
- (21) Turn on hydraulic systems B and C pressure (Ref. 29-11-00).
- (22) Bleed truck positioner at bleed fitting.
- (23) Bleed normal and alternate brake systems (Ref. 32-43-00).
- (24) Remove MLG door actuator lock and close MLG inboard door (Ref. 32-33-00).
- (25) Remove tags and close circuit breakers opened in Step 4A(6).

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EFFECTIVITY: ALL

32-11-03
Page 413
May 15/85

LOCKHEED



MAINTENANCE MANUAL

- (26) Service MLG strut (Ref. 12-14-12).
- (27) Perform Truck Unlevel Position Sensor Test (Ref. 32-61-08).
- (28) Perform landing gear retraction and extension (Ref. 32-30-00).

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EFFECTIVITY: ALL

32-11-03
Page 414
May 15/85

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR AXLE - REMOVAL AND INSTALLATION

1. General

This procedure is for removal and installation of any main landing gear (MLG) axle.

2. Equipment and Materials

Wheel chocks

Wing Jack

Axle Jack

- R Grease, Ref. MM 12-20-00, Lubrication, Scheduled Servicing
- Environmental Seal, C-40-769 Type 2, or equivalent
- Cord Stock, Ethylene Propylene Rubber, 0.070-inch diameter, Santech Industries, Arlington, Texas, or equivalent
- Lock-wire, Fed Spec QQ-W-390, 0.047-inch diameter, or equivalent

3. Referenced Procedures

- | | |
|----------|---|
| 7-11-00 | Wing and Fuselage Jacking - Maintenance Practices |
| 7-12-00 | Axle Jacking - Maintenance Practices |
| 12-14-12 | Main Landing Gear - Servicing |
| 20-51-04 | Environmental Sealing of Model L-1011 Airplane (PB75-425) |
| 32-33-00 | Main Landing Gear Inboard Door - Maintenance Practices |
| 32-41-01 | Main Landing Gear Wheels and Tires - Removal and Installation |
| 32-43-00 | Main Landing Gear Brake System - Maintenance Practices |
| 32-43-01 | Main Landing Gear Brake - Removal and Installation |
| 32-44-00 | Antiskid Control System - Adjustment and Test |

EFFECTIVITY: ALL

001B

32-11-04
Page 401
May 15/85



MAINTENANCE MANUAL

32-44-04 Wheel Speed Sensor and Hub (Drive) Cap Assembly - Removal and Installation

32-45-00 Brake Temperature System - Adjustment and Test

4. Removal/Installation

A. Removal

- (1) Verify that all landing gear downlock safety pins are installed.
- (2) Manually open applicable main landing gear (MLG) inboard door and install MLG door actuator lock (Ref. 32-10-00).
- (3) Install chocks and chain binders on MLG not being worked, and install chocks on nose landing gear (NLG).
- (4) Install wing jacks under both wing jack points and jack to a height of six inches above normal static strut extension (Ref. 7-11-00).
- (5) At filler valve (top of strut) of MLG from which axle is being removed, release air or nitrogen charge from shock strut by removing dust cap from charging valve and turning valve upper nut three to four turns counterclockwise.

R

WARNING: CARE MUST BE OBSERVED WHILE JACKING AXLE TO ENSURE THAT MLG STRUT IS COMPRESSING AND THAT LOAD ON WING JACK IS NOT BEING RELIEVED.

- (6) Install axle jack under axle being removed and jack until tires clear ground by two inches (Ref. 7-12-00).
- (7) Remove both MLG wheels and tires (Ref. 32-41-01).
- (8) Remove both MLG brakes (Ref. 32-43-01).
- (9) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker BRAKE ANTISKID (F22).
- (10) At both ends of axle, remove wheel speed sensors (Ref. 32-44-04).

NOTE: Cable is installed with a loop to provide approximately twelve inches of cable slack.

EFFECTIVITY: ALL

32-11-04
Page 402
Aug 15/81

001B

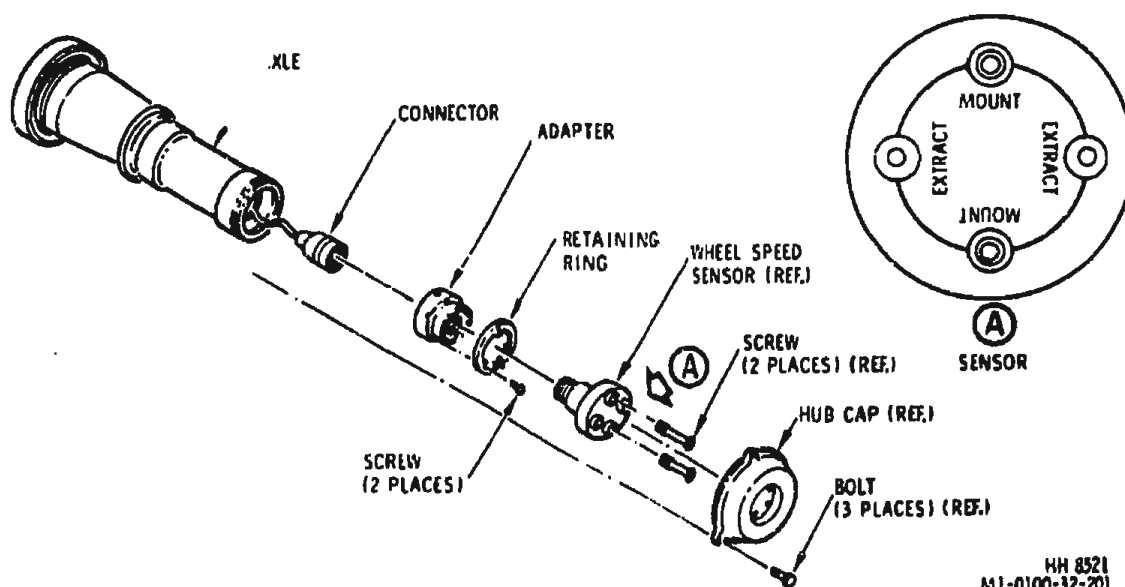
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MAINTENANCE MANUAL

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CAUTION: BE SURE RIGHT AND LEFT CONNECTORS ARE PROPERLY TAGGED.

- (11) Tag sensor connectors (right and left) to ensure correct installation.
- (12) Remove screws securing adapter retaining rings at each end of axle (Ref. Fig. 401).
- (13) Compress retaining rings and withdraw from grooves in axles.
- (14) Remove adapter from each end of axle.
- (15) On aircraft 001-014,
loosen cable retainer nuts and remove two cable retainers from inside axle.
- (15) On aircraft 015-999,
remove cable clamp screws. Loosen cable retainer bolts and remove two cable retainers from inside axle.

NOTE: Wheel speed sensor connectors must not be disconnected from cables. After removing axle retaining pin from bushed hole in truck beam and



Wheel Speed Sensor Adapter - Removal and Installation
Figure 401

EFFECTIVITY: ALL

001B

32-11-04
Page 403
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL

axle, the connectors are removed through the truck beam and axle hole.

- (16) In applicable axle junction box (J3 or J4), tag and disconnect ground connections and pull out slack in wheel speed sensor cables.
- (17) In junction box, remove nut securing junction box to axle retaining pin and slide up along cables.
- (18) Slide junction box up on cables until clear of axle retaining pin.
- (19) At end of truck beam remove axle retaining pin retainer and washer.
- (20) Remove axle retaining pin from end of truck beam.
- (21) Pull wheel speed sensor cables and connectors up through bushed hole in truck beam and axle.
- (22) Slide axle out of truck beam.
- (23) Remove cord stock from groove in truck beam axle bearing. Clean groove to remove any residual sealing compound.

B. Installation

- (1) Verify that circuit breaker opened in Step 4A(9) is open and tagged.
- (2) Remove end plate from truck beam end opening.
- (3) Verify that truck beam axle bearing seal grooves (Ref. Fig. 402) are clean and free of any residual sealing compound.
- (4) Cut a length of cord stock so that it fits in bearing seal groove with no gap between ends. Remove cord stock.
- (5) Lightly coat bearing seal grooves with sealing compound (Ref. 20-51-04).
- (6) Position cord stock in seal grooves and wipe off any excess sealing compound.

R

CAUTION: ENSURE THAT THE APPLICABLE AXLE IS INSTALLED.
FAILURE TO DO SO COULD RESULT IN AXLE DAMAGE.

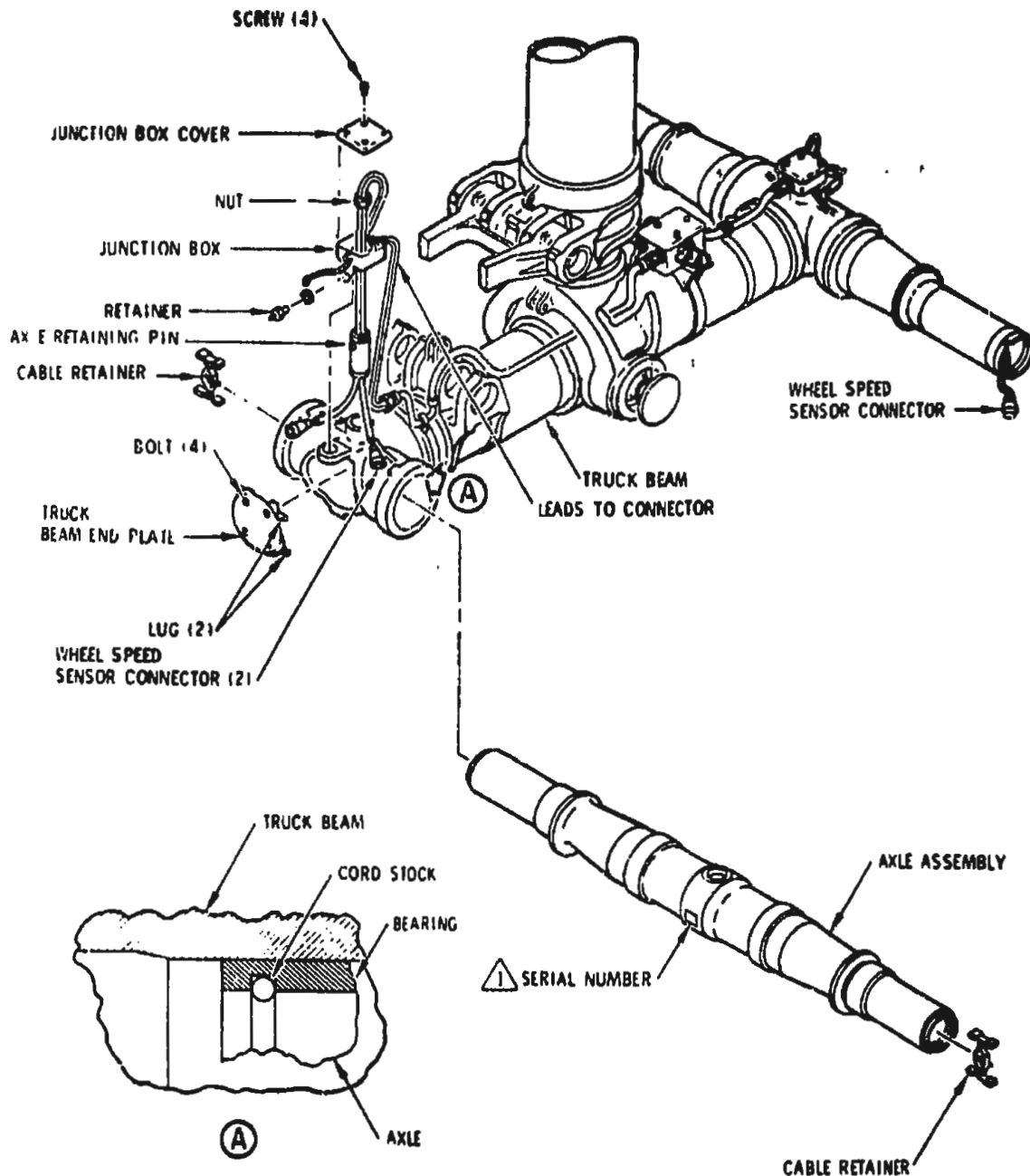
- (7) Lubricate axle with grease.

EFFECTIVITY: ALL

001B

32-11-04
Page 404
May 15/85

LOCKHEED
MAINTENANCE MANUAL



NOTE
⚠ AXLE MUST BE ORIENTED SO THAT SERIAL NUMBER IS VISIBLE WHEN TRUCK BEAM END PLATE IS REMOVED

M1-0101-32-520

Main Landing Gear Axle - Removal and Installation
Figure 402

EFFECTIVITY: ALL

32-11-04
Page 405
Aug 15/75

001B



MAINTENANCE MANUAL

- (8) Ensure that axle is oriented so that serial number will show through truck beam end opening when axle is installed (Ref. Fig. 402).
- (9) Slide axle into truck beam.
- (10) Center axle so that bushed hole for pin is aligned with corresponding hole in truck beam.

CAUTION: BE SURE THAT LEFT AND RIGHT CONNECTORS ARE POSITIONED CORRECTLY. IT IS POSSIBLE TO POSITION THE ANTISKID SENSOR CONNECTORS INCORRECTLY SO THAT THE LEFT AND RIGHT CONNECTORS ARE INTERCHANGED CAUSING BRAKE RESPONSE TO ANTISKID SENSOR SIGNALS TO BE OPPOSITE OF THAT INTENDED.

- (11) Insert wheel speed sensor connectors and cables into bushed hole and orient connectors so that tagged right and left connectors are positioned for correct installation location.
- (12) Align retainer hole in pin with hole in truck beam. Lubricate axle retaining pin.
- (13) Install axle retaining pin and safety to truck beam with lock-wire.
- (14) Install junction box and secure in place with nut.
- (15) Install axle retaining pin retainer and washer.
- (16) Verify correct wheel speed sensor connector installation location.
- (17) Using stiff wire with hooked end, pull one sensor cable and connector out through end of axle until almost all cable slack is removed. Do not pull cable tight.
- (18) Repeat Step (17) for second cable.
- (19) On aircraft 001-014,
install a cable retainer over cable on each end of axle at least 12 in. from end of axle. Stow excess cable in a loop inside axle.
- (19) On aircraft 015-999,
install cable retainer inside axle at least 12 in. from end of axle. Install cable clamp on cable and secure to bracket with screw. Stow excess cable in a loop inside axle.

LOCKHEED



MAINTENANCE MANUAL

- (20) Insert a wheel speed sensor adapter into each end of axle.
- (21) Install adapter retaining rings into grooves in each end of axle and secure to adapter with screws.
- (22) Install wheel speed sensors (Ref. 32-44-04).
- (23) Install MLG brakes (Ref. 32-43-01).
- (24) Install MLG wheels and tires (Ref. 32-41-01).
- (25) Install end plate over truck beam end opening.
- (26) Remove tag and close circuit breaker opened in Step 4A(9).
- (27) Lower truck and remove axle jack (Ref. 7-12-00).
- (28) Lower aircraft and remove wing jacks (Ref. 7-11-00).
- (29) Perform landing gear brake system bleeding procedures (Ref. 32-43-00).
- (30) Perform antiskid control system adjustment and test (Ref. 32-44-00).
- (31) Perform brake temperature system adjustment and test (Ref. 32-45-00).
- (32) Perform MLG strut servicing procedure (Ref. 12-14-12).

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EFFECTIVITY: ALL

32-11-04
Page 407/408
May 15/85

MAIN LANDING GEAR AXLE - INSPECTION AND CHECK1. General

CR This procedure provides instructions concerning inspection of the axle.

CR 2. Deleted3. Inspection/Check

A. Inspection

- CR (1) Inspect axle for over temperature indication.
- C (2) If paint color shows a tinge of brown to black in area between brake journals, sand off top layer of paint. Paint should be gray. If paint is tan/beige/dark tan/beige/light yellow-brown, keep sanding until primer is reached. If paint color returns to gray, axle is acceptable. If paint is discolored down to the primer, see 3A(6).
- C NOTE: Axle temperature indication on outer surface of axle paint may give false indications of axle overheat. A true overheat condition will cause the wheel fuse plug to blow and discolor primer in the axle ID.
- C (3) Visually inspect all axle chrome plated brake journal lands (two on each side of truck beam) for possible cracks and bronze transfer from bushing to axle chrome plated surface.
- C (4) If bronze transfer is observed it must be removed by hand with 280 grit or finer sandpaper, then visually check chrome plated lands for crack damage. Use a 10X minum magnifying glass to check for cracks.
- C (5) If crack is found, replace axle. If no visual cracks are found, establish a follow up check not later than next C check.
- C (6) If galling of chrome or bronze transfer is found on a journal or if dark discoloration of external paint persists after polishing per Step 3A(2), remove the anti skid transducer from the end of the axle and check

EFFECTIVITY: ALL

001B

32-11-04

Page 601
Nov 15/89

LOCKHEED



MAINTENANCE MANUAL

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condition of primer in the axle ID in the area corresponding to the OD indication.

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- (7) If lv primer is discolored light brown to black, replace the axle before further flight. If extremely light indication, contact engineering and establish a follow up recheck or axle replacement. If no discoloration of axle ID primer and no cracks are detected the axle is acceptable.

R EFFECTIVITY: ALL

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001B

32-11-04

Page 602
Nov 15/89

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR UPLOCK SNUBBER ASSEMBLY
REMOVAL AND INSTALLATION

1. General

Uplock snubber removal and installation is identical in right or left MLG, provided outboard insertion is observed.

R 2. Equipment and Materials

Torque wrench 300 lb-in capacity, or equivalent

Grease, Ref. MM 12-20-00, Lubrication, Scheduled Servicing

Lock-wire, Fed Spec QQ-W-390, 0.032-in diameter, or equivalent

Corrosion Preventive Compound, MIL-C-16173, or equivalent

Cotter Pin, MS24665-153, or equivalent

Low Adhesion Sealing Compound, LAC Spec C-40-769, Type II, or equivalent

3. Referenced Procedures

20-51-04 Environmental Sealing of Model L-1011 Airplane
 (PB75-425)

32-33-00 Main Landing Gear Inboard Door - Maintenance
 Practices

4. Removal/Installation

A. Removal

(1) Install all landing gear downlock safety pins (Ref. 32-33-00).

CR (2) Remove self-locking nuts, washers and retainer that
CR attach uplock snubber inside truck attachment pin (Ref.
CR Fig. 401).

(3) Slide uplock snubber out of truck attachment pin.

B. Installation

EFFECTIVITY: ALL

001B

32-11-06
Page 401
May 15/86



- (1) Coat uplock snubber outboard flange outside diameter with low adhesion sealing compound (Ref. 20-51-04) and inboard flange outside diameter with grease.

CAUTION: ENSURE APPLICABLE UPLOCK SNUBBER ASSEMBLY IS INSTALLED. FAILURE TO DO SO COULD RESULT IN ASSEMBLY DAMAGE.

- (2) Insert uplock snubber into outboard side of truck attachment pin.
- (3) Coat uplock snubber retainer outside diameter and flange face with low adhesion sealing compound, and coat studs with corrosion preventive compound (Ref. 20-51-05).
- (4) Install uplock snubber retainer through inboard side of truck attachment pin.
- (5) Install self-locking nuts and washers.

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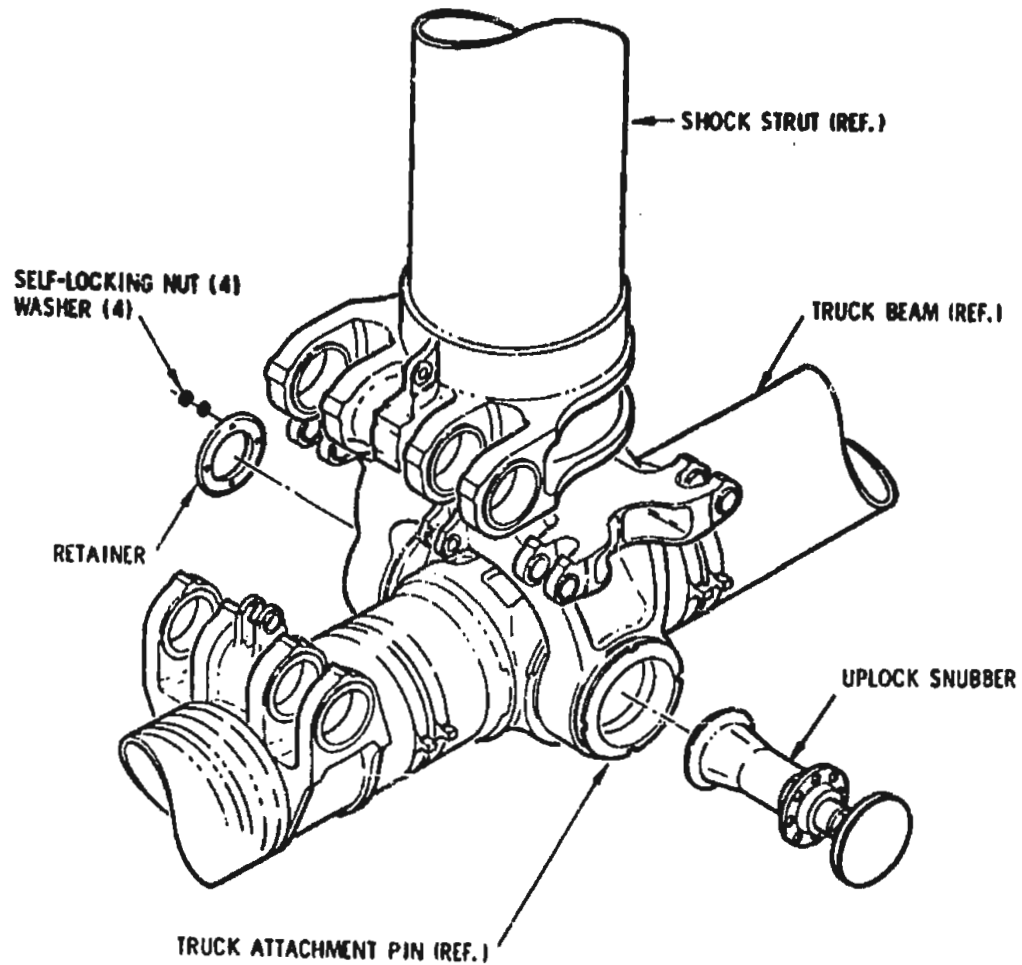
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001B

32-11-06
Page 402
May 15/86

LOCKHEED
MAINTENANCE MANUAL



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CR Main Landing Gear Uplock Snubber - Removal and Installation
CR Figure 401

R EFFECTIVITY: ALL
R
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32-11-06
Page 403/404
May 15/86

MAIN LANDING GEAR UPLOCK SNUBBER ASSEMBLY - INSPECTION AND CHECK1. Equipment and Materials

Scale, 6-inches long, or equivalent

Hydraulic fluid, MIL-H-5606

2. Referenced Procedure

32-11-06 Main Landing Gear Uplock Snubber Assembly - Removal and Installation

3. Inspection/Check

A. Inspection

- R (1) At main landing gear (MLG) truck pin, zone 731 or 741,
R measure distance from face of truck attachment pin to
face of uplock snubber pad (Ref. Fig. 601 Position
"A"). Note this dimension (Y).

R NOTE: Snubber piston must be as configured after
R normal extension of MLG assembly.

- R (2) Hand pull piston outward until piston is fully extended
R (Ref. Fig. 601, Position "B").

- (3) Measure distance from face of trunk attachment pin to
face of uplock snubber pad. Note this dimension (X).

NOTE: Piston must be held out for measurement because
it may be pulling a vacuum internally and will
not remain out.

- (4) Subtract dimension (Y) obtained in Step (1) from
dimension (X) obtained in Step (3).

- (5) If resulting dimension is 0.25 inch or more, replace
snubber (Ref. 32-11-06).

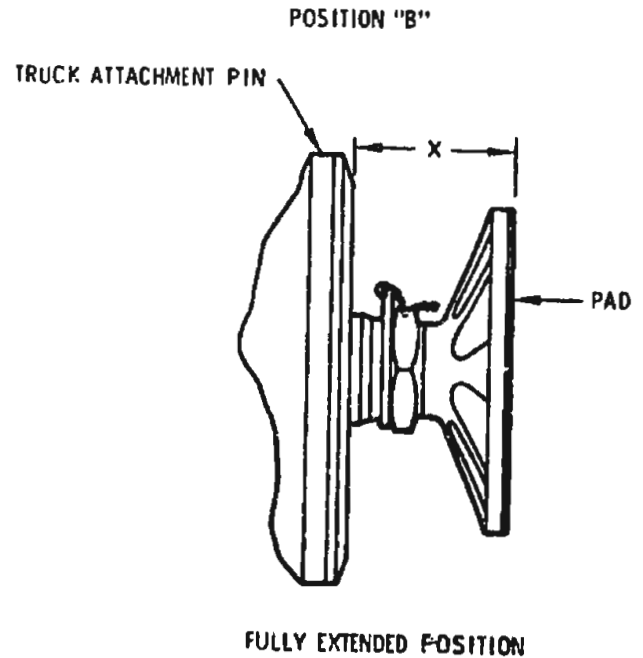
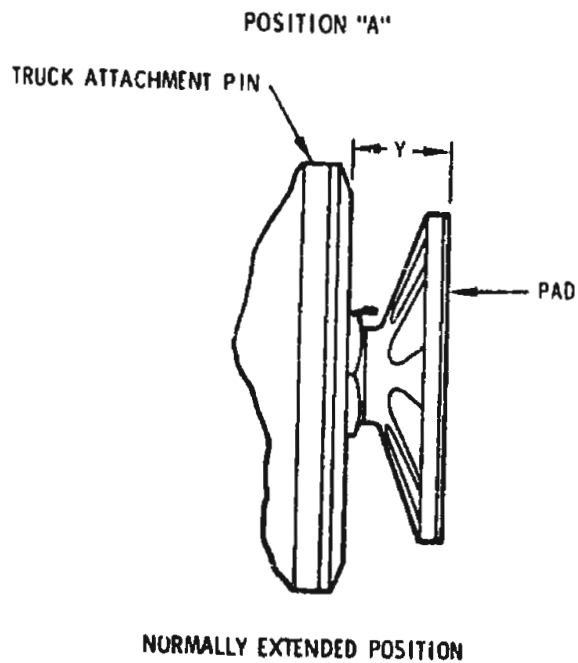
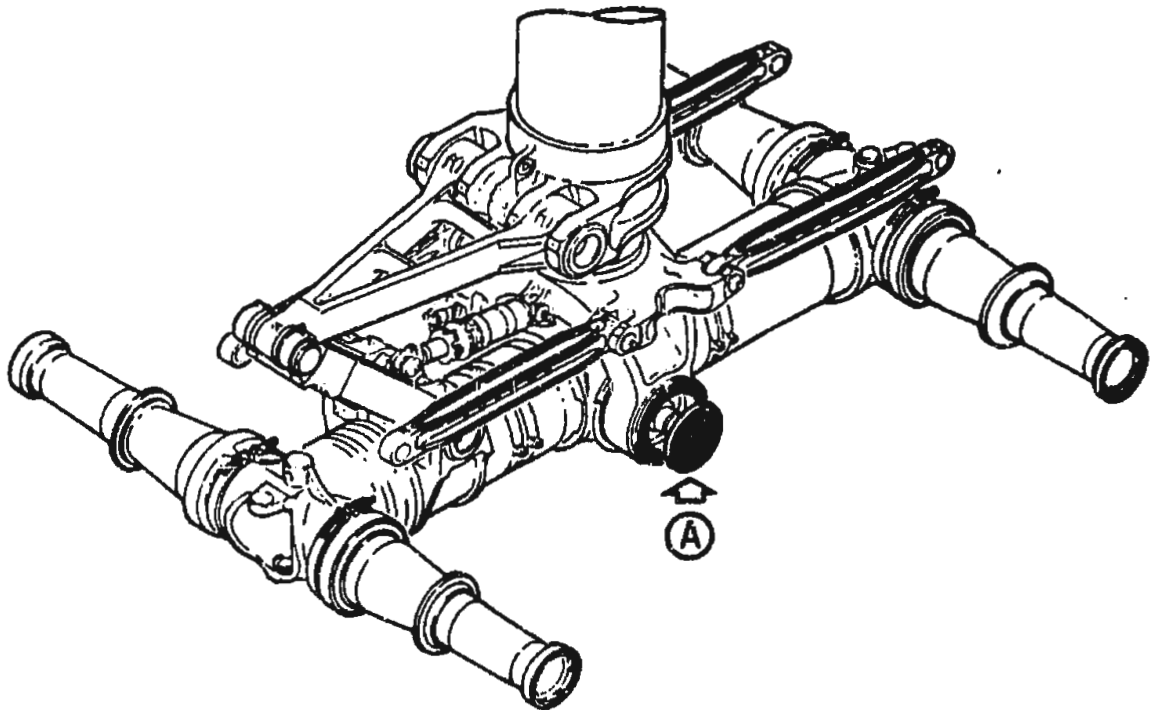
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001B

32-11-06

Page 601
Mar 15/83

LOCKHEED
MAINTENANCE MANUAL



(A)

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R Main Landing Gear Uplock Snubber Assembly - Inspection and Check
R Figure 601

EFFECTIVITY: ALL

32-11-06
Page 602
Mar 15/83

001B

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MAINTENANCE MANUAL

MAIN LANDING GEAR BRAKE TORQUE LINK ASSEMBLY
REMOVAL AND INSTALLATION

1. Equipment and Materials

- R Grease, Ref. MM 12-20-00, Lubrication, Scheduled Servicing
Cotter Pin, MS24665-153, or equivalent

2. Referenced Procedures

- 12-24-01 Main Landing Gear Truck Lubrication
32-33-00 Main Landing Gear Inboard Door - Maintenance Practices

3. Removal/Installation

A. Removal

- (1) Verify that main landing gear (MLG) and nose landing gear (NLG) downlock safety pins are installed.
- (2) Verify that flight station LANDING GEAR control lever is in DOWN position.
- (3) Open applicable MLG inboard door and install inboard door actuator lock (Ref. 32-33-00).

NOTE: Opening and locking the inboard door is accomplished to prevent door operation while personnel are in the vicinity of the door swing area.

- (4) Remove bolts, caps, and pins from both ends of brake torque link.

NOTE: It may be necessary to rotate brake slightly in order to remove a binding pin.

- (5) Remove torque link.

B. Installation

NOTE: The outside surface of both pins and the inside surfaces of four bearings must be lubricated with a thin coating of grease prior to installation.

EFFECTIVITY: ALL

001B

32-11-07
Page 401
May 15/85



- (1) Position brake torque link and install pin through brake torque link and strut lug bearings.
- (2) Install pin through brake torque link and brake lug bearings.

NOTE: It may be necessary to rotate brake slightly to align bearings in brake lugs with bearings in torque link.

- (3) Secure pins in place with bolts, caps, washers, and nuts.
- (4) Safety nuts with cotter pins.
- (5) Pressure lubricate all bearings (Ref. 12-24-01).
- (6) Close MLG inboard door (Ref. 32-33-00).

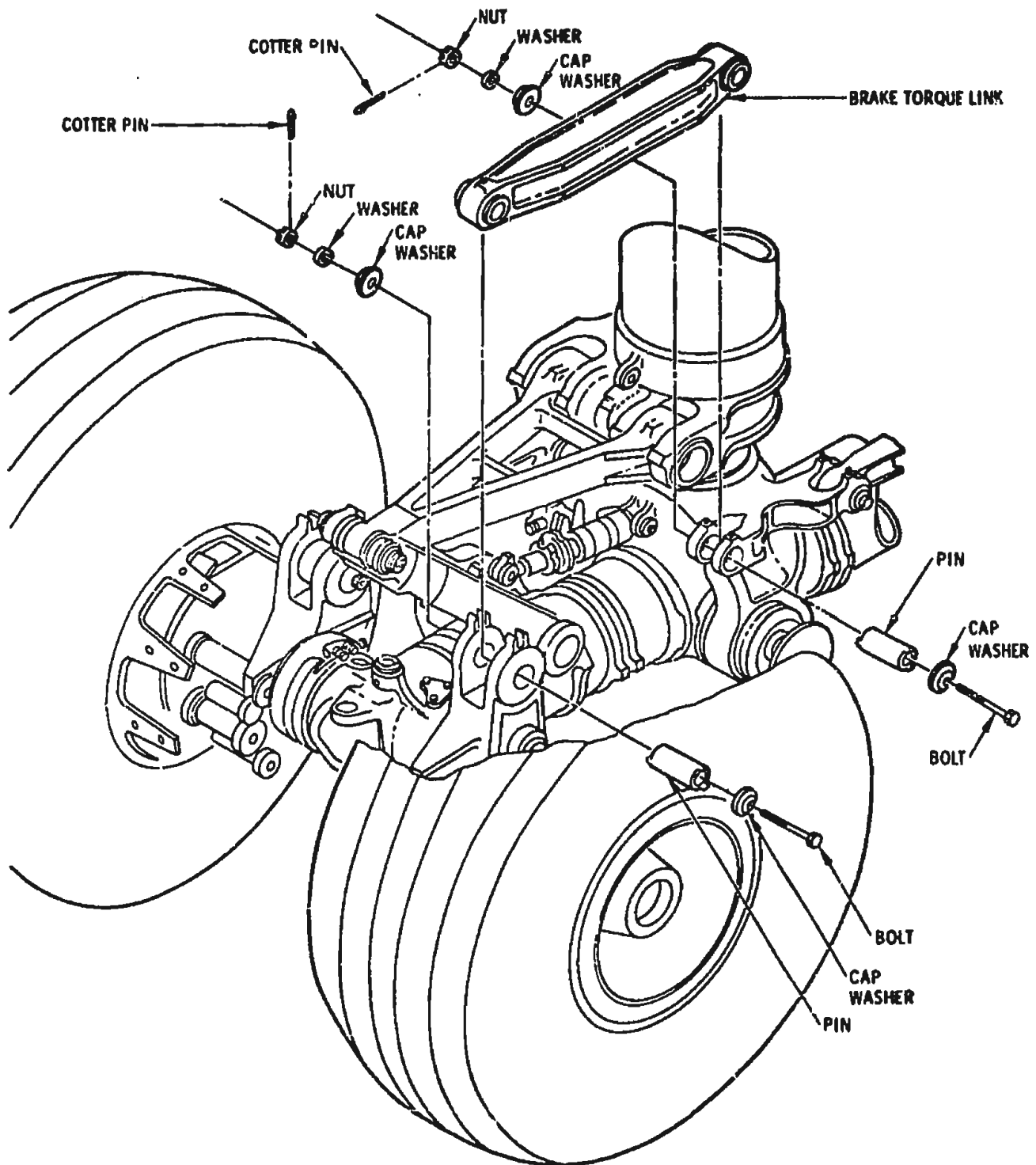
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EFFECTIVITY: ALL

001B

32-11-07
Page 402
Nov 15/83

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-72

Main Landing Gear Brake Torque Link Assembly
Removal and Installation
Figure 401

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R EFFECTIVITY: ALL
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32-11-07
Page 403/404
Nov 15/77



MAIN LANDING GEAR UPPER AND LOWER TORQUE ARMS
REMOVAL AND INSTALLATION

1. General

This procedure is used to separate or join at the apex the upper and lower torque arms, or to remove either one from the MLG shock strut.

2. Equipment and Materials

- Lock-wire, Fed Spec QQ-W-390, 0.040-inch diameter, or equivalent
- R Grease, Ref MM 12-20-00, Lubrication, Scheduled Servicing
- Low Adhesion Sealing Compound, LAC Spec C-40-769, Type II, or equivalent
- Cotter Pin, MS 24665-349, or equivalent
- Cotter Pin, MS 24665-153, or equivalent
- Torque Arm Apex Spacer, PN 1523131-107 thru -119
- Upstop Snubber Restraining Wrench, WR-10-106, or equivalent
- Socket Wrench, PN 1523104-105-ATST-4, or equivalent

3. Referenced Procedures

- 12-24-00 Landing Gear and Doors - Lubrication
- 20-51-04 Environmental Sealing of Model L-1011 Airplane (PB75-425)
- 32-11-10 Main Landing Gear Upstop Snubber - Removal and Installation

4. Removal/Installation

A. Removal - Upper Torque Arm

(1) Separate upper and lower torque arms as follows:

- (a) Remove cotter pin, nut, washer, and lockbolt from apex bolt at apex of upper and lower torque arms (Ref. Fig. 401).

EFFECTIVITY: ALL

001B

32-11-08
Page 401
May 15/85

LOCKHEED
MAINTENANCE MANUAL

- (b) Support upper and lower torque arms, and remove apex bolt, cupped washers, and spacers from torque arms.
- (c) Mark washers and spacers upon removal for reassembly in their respective locations.
- (d) Inspect removed washers and spacers for cracks.
- (e) Replace any cracked and/or missing washers or spacers with new washers or spacers.

NOTE: Spacer removal and/or replacement will require an alignment adjustment and check.

- (f) Secure or pad both torque arms to avoid contact-damage with gear.

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- (2) Remove upstop snubber (Ref. 32-11-10).
- (3) Support upper torque arm to reduce side loads on upper torque arm pins. Remove upper torque arm pins.

NOTE: Do not lose serrated bushings.

B. Installation - Upper Torque Arm

- (1) Coat outside diameter and inside flange of serrated bushings with low-adhesion-sealing sealing compound (Ref. 20-51-04). Install one serrated bushing in each upper torque arm pin.
- (2) Coat outside diameter of upper torque arm pins with grease.
- (3) Attach snubber attachment pin to end of upstop snubber with bolt and nut.
- (4) Support and align upper torque arm between lugs at lower end of shock strut. Install upper torque arm pins.
- (5) Coat inside diameter of serrated bushings and inboard diameter of torque arm pins with grease. Slide upstop snubber and attachment pin in bore of inboard torque arm pin.
- (6) Coat threads and bearing face of upstop snubber retaining nut with grease and install on snubber attachment pin.

EFFECTIVITY: ALL

001B

32-11-08
Page 402
Jun 15/95



MAINTENANCE MANUAL

- (7) While maintaining joint rotational freedom, use socket wrench and upstop snubber restraining wrench to tighten upstop snubber retaining nut. Torque nut 5 to 150 lb ft until cotter pin can be easily installed.
- (8) Install cotter pin.
- (9) Join the upper and lower torque arms by reusing premarked cupped washers and spacers in same positions from which they were removed (Ref. Fig. 401).

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- (a) Place cupped washers (item 12), one on each side, in position over spherical surfaces of bushings in forward end of upper torque arm. Position four (4) apex spacers (item 22) on inboard side of upper torque arm.

- (b) Engage upper torque arm with lower torque arm. Align hole in each torque arm and retain parts in this position by temporarily installing apex bolt.

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- (c) Determine thickness of required apex washers as follows:

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Hold apex spacers firmly against upper torque arm cupped washer. Measure gap between lower torque arm bushing and outermost apex spacer. Measure gap between lower torque arm bushing and cupped washer on outboard side. Divide total measurement by two (2) and note dimension for use in following step:

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- (d) Select two (2) torque arm apex washers (item 13) [0.072 to 0.096-inch thick] and place on each side of the upper torque arm to obtain 0.001 to 0.005-inch clearance on each side.

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NOTE: Space Washers P/N 1523131-107, -109, -111-113, -115, -117 and -119 are available in thicknesses from 0.072 ± 0.001 to 0.096 ± 0.001 in increasing steps of 0.004 ± 0.001 and may be used singly or in combination as required to achieve the desired 0.001 to 0.005 clearance.

R

NOTE: One spacer (item 13) is used with each cupped washer and thickness of spacers must be within .005 of each other.

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- (e) Remove apex bolt temporarily installed in Step (b).

EFFECTIVITY: ALL

001B

32-11-08

Page 403
May 15/87



MAINTENANCE MANUAL

- R (f) Coat bearing surfaces of bolt, washers, and nut
R with grease.
- R (g) Assemble torque arms, cupped washers, apex washers
R and grouped spacers in their appropriate positions
R and install apex bolt.

R NOTE: There are two (2) matched sets of apex
R spacers placed on inboard side of apex bolt
R (item 22). Actual placement of apex
R spacers is determined by performing MLG
R alignment adjustment and check (Ref.
R 32-11-00).

Ensure apex bolt threads face inboard.

- R (h) Install apex bolt retaining nut. Maintaining
joint rotational freedom, torque nut 5 to 150 lb
ft. until lockbolt can be easily installed.
- R (i) Install lockbolt, washer, and nut. Secure
lockbolt with cotter pin.
- (10) Lubricate upper and lower torque arms (Ref. 12-24-00).
- R (11) Perform MLG alignment adjustment and check (Ref.
R 32-11-00).

C. Removal - Lower Torque Arm

- (1) Remove cotter pin from lower torque arm pin retaining
bolt. Remove nut using socket wrench. Push out
retaining bolt (Ref. Fig. 402).
- (2) Support lower torque arm to relieve side loads on lower
torque arm pins. Remove pins and torque arm from
truck.

NOTE: Do not lose serrated bushings.

D. Installation - Lower Torque Arm

- (1) Coat outside diameter and inside flange of serrated
bushings with low adhesion sealing compound (20-51-04)
and install one bushing in each pin.
- (2) Coat outside diameter of lower torque arm pins with
grease.
- (3) Support and align lower torque arm aft attachment lugs
with corresponding lugs at forward upper surface of
truck beam assembly. Install lower torque arm pins.

EFFECTIVITY: ALL



32-11-08
Page 405
Jul 15/83

001B

LOCKHEED



MAINTENANCE MANUAL

- (4) Coat threads and bearing face of nut and inside diameter and flange of each serrated bushing with grease.
- (5) Install bolt through serrated bushings and secure with nut. While maintaining joint rotational freedom, torque nut 5 to 150 lb ft until cotter pin can be easily installed.
- (6) Lubricate upper and lower torque arms (Ref. 12-24-00).
- (7) Perform MLG alignment adjustment and check (Ref. 32-11-00).

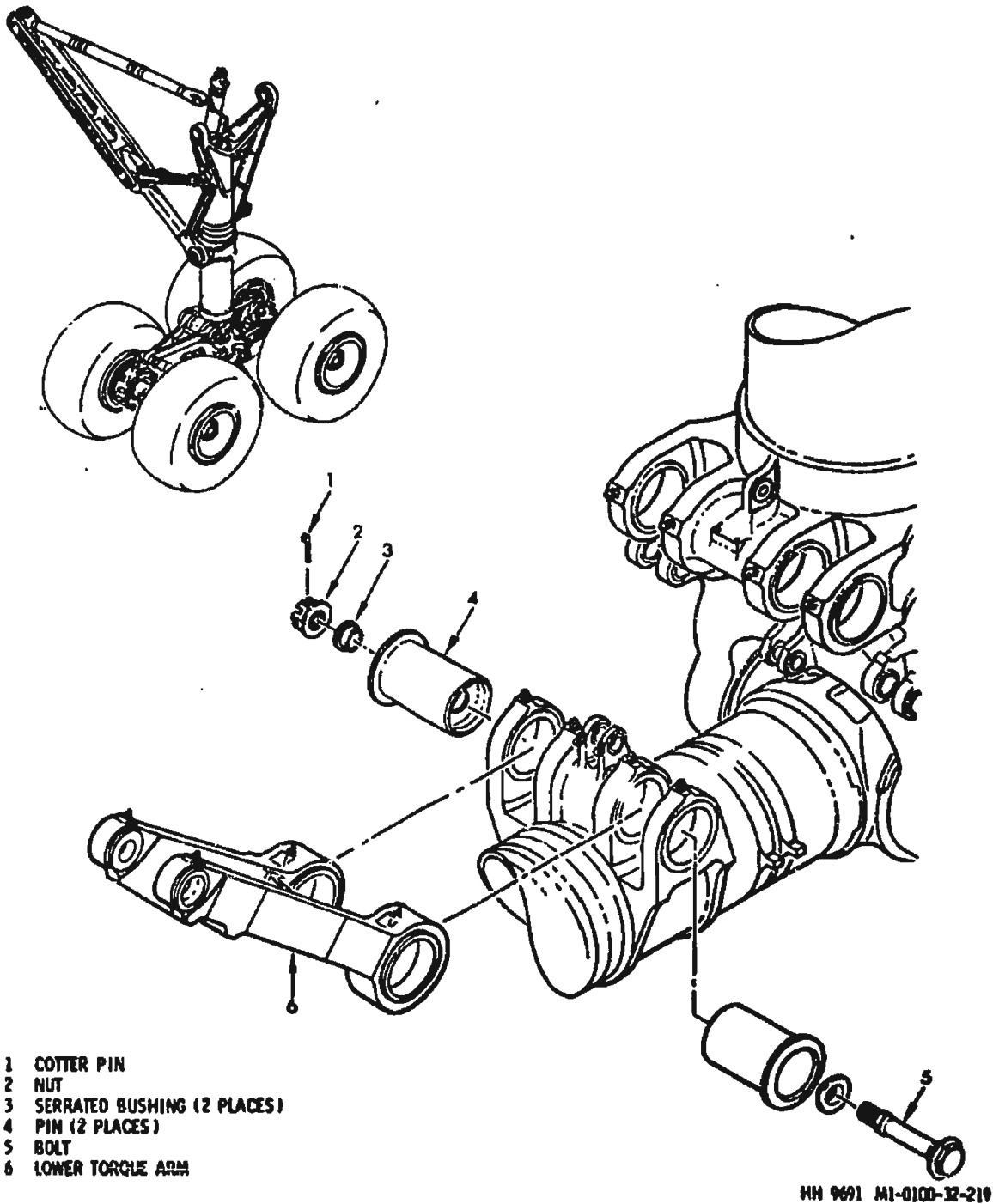
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EFFECTIVITY: ALL

001B

32-11-08
Page 406
May 15/87

LOCKHEED
MAINTENANCE MANUAL



Main Landing Gear Lower Torque Arm - Removal and Installation
Figure 402

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EFFECTIVITY: ALL

32-11-08
Page 407/408
Nov 15/83

C MAIN LANDING GEAR UPPER AND LOWER TORQUE ARMS - INSPECTION AND CHECKC 1. Equipment

C Feeler Gage

C 2. Referenced ProcedureC 32-11-08 - Main Landing Gear Upper and Lower Torque Arms -
C Removal and InstallationC 3. Inspection/Check

C A. Main Landing Gear (MLG) Torque Link Apex Clearance

C (1) Check the side clearance at the MLG torque link apex
C joint. This joint is originally assembled with .001 to
C .005 clearance on each side of the upper link apex
C spherical cupped washers or a total clearance of .002
C to .010 on each gear. Maximum inservice clearance at
CR the MLG torque link apex joint is a total clearance of
CR .050.

CR (2) If total clearance at the apex exceeds .050, readjust
C as required per 32-11-08, Installation - Upper Torque
C Arm.

EFFECTIVITY: ALL

002B

32-11-08
Page 601/602
Dec 15/92

MAIN LANDING GEAR UPSTOP SNUBBER - REMOVAL AND INSTALLATION**1. General**

An upstop snubber is installed in the bore of the inboard upper torque arm pin in both the right and left MLG. Removal and installation procedures are the same for the right or left MLG.

2. Equipment and Materials

R Grease, Ref. MM12-20-00, Lubrication, Scheduled Servicing

Upstop Snubber Restraining Wrench, Menasco PN WR-10-106, or equivalent

3. Removal/Installation**A. Removal**

- (1) While holding upstop snubber with snubber restraining wrench, remove cotter pin and nut at inboard end inside upper torque arm pin (Ref. Fig. 401).

CAUTION: DO NOT ATTEMPT TO SHEAR COTTER PIN WHEN REMOVING NUT. EXCESS TORQUE WILL DAMAGE RETAINING RING ON UPSTOP SNUBBER CYLINDER.

- (2) Pull out snubber with assembled parts.
- (3) Disconnect upstop snubber from pin by removing lockbolt.

B. Installation

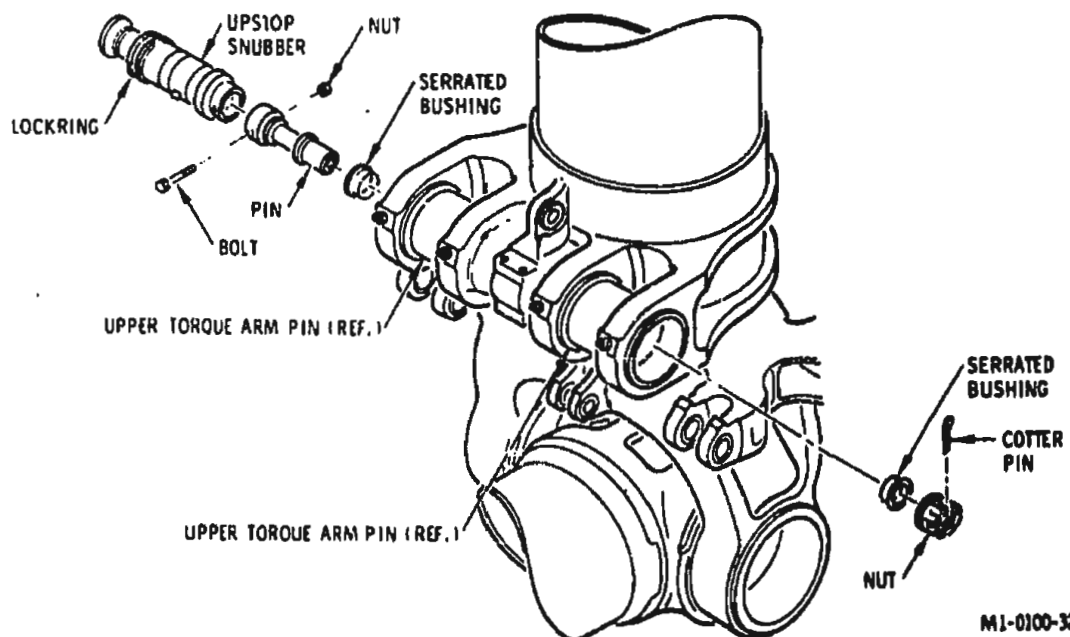
- (1) Attach pin to end of upstop snubber with lockbolt.
- (2) Coat inside diameter of serrated bushings and inside diameter of inboard upper torque arm pin with grease.
- (3) Slide upstop snubber with pin into bore of torque arm pin.
- (4) Lubricate threads and nut bearing face with grease, and install nut.
- (5) While holding upstop snubber with restraining wrench, tighten nut to 5 to 150 lb ft. Safety with cotter pin.

EFFECTIVITY: ALL

001B

32-11-10
Page 401
May 15/85

LOCKHEED
MAINTENANCE MANUAL



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Main Landing Gear Upstop Snubber - Removal and Installation
Figure 401

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EFFECTIVITY: ALL

32-11-10
Page 402
Feb 15/74

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR UPSTOP SNUBBER ASSEMBLY - INSPECTION AND CHECK

1. Equipment and Materials

Scale, 6-inches long, or equivalent

2. Referenced Procedure

32-11-10 Main Landing Gear Upstop Snubber Assembly - Removal and Installation

3. Inspection/Check

A. Inspection

(1) At main landing gear (MLG) upper torque arm pin, zone 731 or 741, measure distance from face of torque arm pin to face of upstop snubber pad (Ref. Fig. 601). Note this dimension (Y).

(2) Hand pull piston outward until piston is fully extended.

NOTE: If piston is fully extended and cannot be moved, snubber is serviceable.

(3) Measure distance from face of torque arm pin to face of upstop snubber pad. Note this dimension (X).

NOTE: Piston must be held out for measurement because it may be pulling a vacuum internally and will not remain out.

(4) Subtract dimension (Y) obtained in Step (1) from dimension (X) obtained in Step (3).

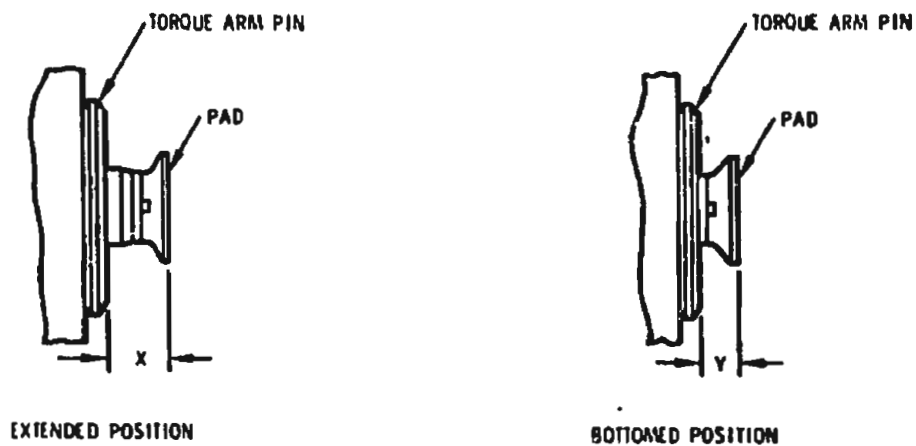
(5) If resulting dimension is 0.25 inch or more, snubber needs replacement (Ref. 32-11-10).

EFFECTIVITY: ALL

32-11-10
Page 601
Jun 15/79

001B

LOCKHEED
MAINTENANCE MANUAL



MI-0100-32-418

R Main Landing Gear Upstop Snubber Assembly - Inspection and Check
R Figure 601

EFFECTIVITY: ALL

001B

32-11-10
Page 602
Nov 15/73

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR UPPER SIDE BRACE ASSEMBLY
REMOVAL AND INSTALLATION

1. General

This procedure is for removal and installation of the left MLG upper side brace assembly. Removal and installation of the right assembly is identical.

2. Equipment and Materials

- R Grease, Ref. MM12-20-00, Lubrication, Scheduled Servicing
Cotter Pin, MS24665-153, or equivalent
Low Adhesion Sealing Compound, LAC Spec C-40-769, Type II, or equivalent
Forward Fuselage Jack
Wing Jack
Jack Pad Adapters
Maintenance Platform (3 to 13 feet), Aircraft Equipment Co. Model 605, or equivalent
Nylon strap assemblies (500-pound load capacity minimum), or equivalent
Wrench, MLG Side Brace Pin, PN BC73, or equivalent
Wrench, MLG Side Brace Nut, PN BC74, or equivalent
Portable Hoist, Wadell Equipment Co. Inc., PN WE3981, or equivalent
Kit, sockets, MLG Side Brace, PN BC95, or equivalent
MLG Side Brace Tool Set, PN B967-101, or equivalent

3. Referenced Procedures

- 7-11-00 Wing and Fuselage Jacking - Maintenance Practices
9-11-00 Normal Towing Conditions - Maintenance Practices
10-10-00 Parking - Maintenance Practices

EFFECTIVITY: ALL

001B

32-11-11
Page 401
May 15/85



12-24-01	Main Landing Gear - Servicing
20-51-04	Environmental Sealing of Model L-1011 Airplane (PB75-425)
24-00-00	Electrical Power - Maintenance Practices
29-11-00	Hydraulic Power System - Maintenance Practices
32-10-00	Main Landing Gear Inboard Door - Maintenance Practices
32-30-00	Landing Gear Retraction and Extension - Adjustment and Test

4. Removal/Installation

A. Removal

- (1) Verify that all landing gears downlock safety pins are installed (Ref. 10-10-00).

NOTE: When positioning aircraft for jacking, ensure that aircraft has traveled in a straight path for a minimum distance of 15 feet to relieve tire scrubbing loads and to prevent a side preload on the landing gear (Ref. 9-11-00).

- (2) In flight station on pilots center instrument panel, tag landing gear control in DOWN position to prevent movement.
- (3) Jack aircraft in a level attitude at wing and fuselage jacking stations, until tires clear floor by approximately 6 inches (Ref. 7-11-00).
- (4) Turn off electrical power (Ref. 24-00-00).
- (5) Pull D-handle to open applicable MLG inboard door and install MLG door actuator lock (Ref. 32-10-00).
- (6) Ensure that hydraulic system C pressure is 0 psi and depressurize C system reservoir (Ref. 29-11-00).
- (7) Place maintenance platform in position for access to side brace inboard attachment joint.

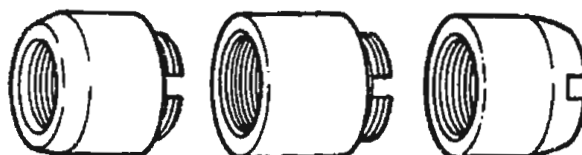
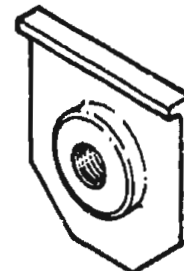
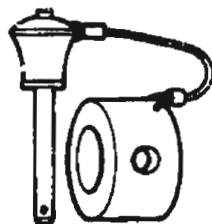
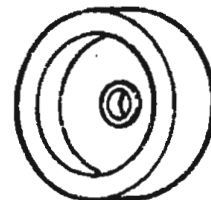
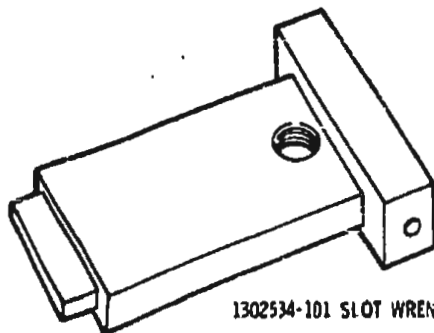
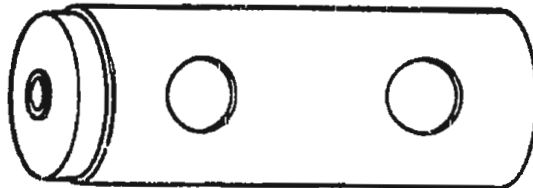
NOTE: Tools required to remove and install the upper side brace upper and center pins are included in MLG side brace tool set, PN B967-101 (Ref. Fig. 401).

EFFECTIVITY: ALL

001B

32-11-11
Page 402
May 15/85

LOCKHEED
MAINTENANCE MANUAL



MI 0100-32-462

Upper Side Brace Removal and Installation Tools
Figure 401

EFFECTIVITY: ALL

32-11-11
Page 403
May 15/74

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001B



MAINTENANCE MANUAL

- (8) At upper end of side brace, remove sensor target bracket and phase control link (Ref. Fig. 402).

NOTE: Some aircraft are configured such that hydraulic lines interfere with the upper side brace pin removal tools. If this is the case, these lines must be freed to permit displacement; perform Steps (9) and (10). If not the case, proceed to Step (11).

- (9) Remove clamps and fasteners from two hydraulic lines.

- R (10) Verify ALTERNATE HYDRAULIC LANDING GEAR EXTENSION
R switch is in covered down position and tag to prevent
R movement.

- R (11) Disconnect LG ALTR DN hydraulic line. Cap and plug
line connectors.

- R (12) Rig a portable hoist adapter sling, portable hoist, and
side brace sling to lateral brace and side brace (Ref.
Fig. 402).

- R (13) Using MLG side brace tool set, remove side brace upper
pin as follows:

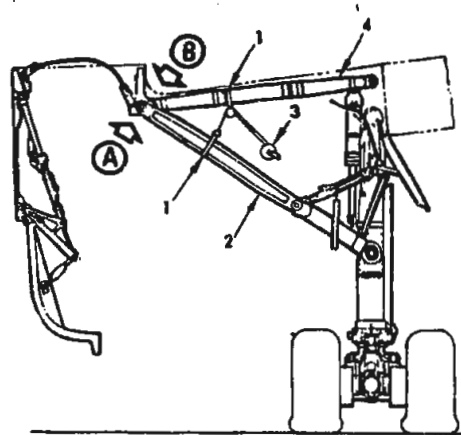
- (a) Remove upper pin nut lock bolt (Ref. Fig. 402).
- (b) Remove upper pin nut and washer.
- (c) Install removal shaft through case and insert shaft through pin from head side.
- (d) Position starter at threaded end of pin and screw shaft into starter. Threads are left hand.
- (e) Using wrench, turn shaft counterclockwise until starter is drawn in flush with side brace bearing face.
- (f) Turn shaft clockwise until starter is exposed enough to permit removal from shaft. Remove starter.
- (g) Using slot wrench, install bolt-end retainer segment onto threaded end of pin.
- (h) Coat outside diameter of bolt-end retainer segment with grease.
- (i) Rotate drive shaft counterclockwise until bolt-end retainer segment is drawn far enough into side

EFFECTIVITY: ALL

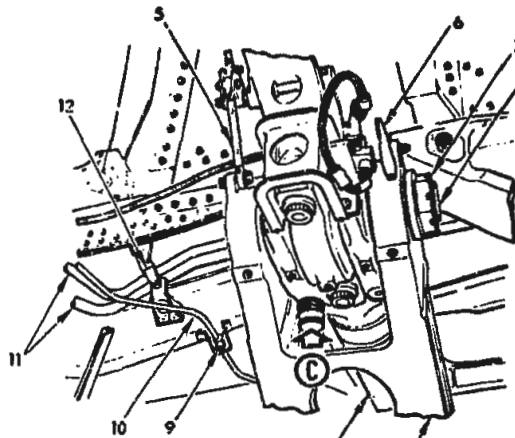
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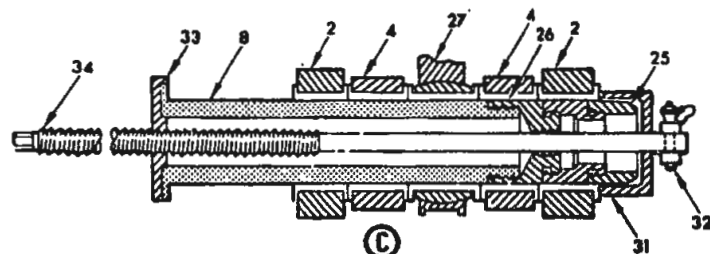
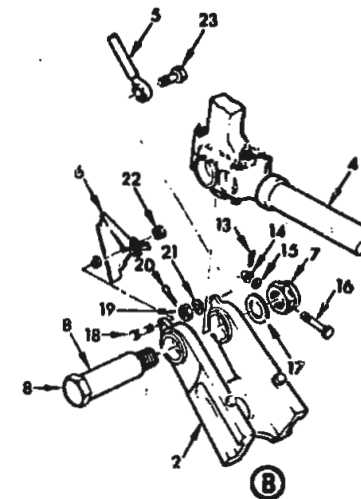
Page 404
May 15/85



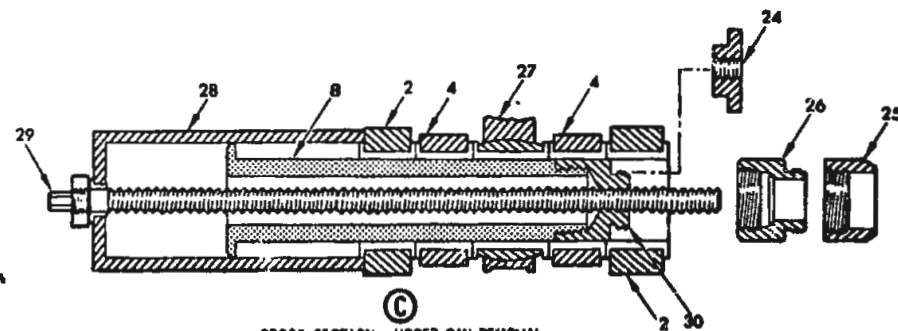
MAIN LANDING GEAR
VIEW LOOKING AFT
LEFT SIDE SHOWN, RIGHT SIDE OPPOSITE



VIEW LOOKING OUTBOARD



CROSS SECTION - UPPER PIN INSTALLATION



CROSS SECTION - UPPER PIN REMOVAL

- | | | | | |
|-------------------------|------------------------------|----------------------------|------------------------------|------------------------------|
| 1 MYLON STRAP | 8 UPPER PIN | 15 WASHER | 22 NUT | 29 REMOVAL SHAFT |
| 2 UPPER SIDE BRACE | 9 B-NUT | 16 UPPER PIN NUT LOCK BOLT | 23 BOLT | 30 BOLT-END RETAINER SEGMENT |
| 3 PORTABLE HOIST | 10 LG ALTR DN HYDRAULIC LINE | 17 UPPER PIN WASHER | 24 STARTER | 31 BEARING |
| 4 LATERAL BRACE | 11 HYDRAULIC LINES | 18 BOLT | 25 OPEN-END RETAINER SEGMENT | 32 STOP |
| 5 PHASE CONTROL LINK | 12 CLAMP (2) | 19 NUT | 26 CENTER RETAINER SEGMENT | 33 NUT |
| 6 SENSOR TARGET BRACKET | 13 COTTER PIN | 20 COTTER PIN | 27 ECCENTRIC BEARING | 34 INSTALLER SHAFT |
| 7 UPPER PIN NUT | 14 NUT | 21 WASHER | 28 CASE | |

M1-0103-32-255

R Upper Side Brace Upper Pin - Removal and Installation
R Figure 402

EFFECTIVITY: ALL

32-11-11
Page 405/406
May 15/77



MAINTENANCE MANUAL

brace to assemble center segment onto bolt-end segment. Grease center segment.

- (j) Rotate drive shaft until center segment is drawn into side brace far enough to permit installation of open-end segment onto center segment. Grease open-end segment.

WARNING: CARE MUST BE EXERCISED TO ENSURE THAT SEGMENTED RETAINER IS ENGAGING LATERAL BRACE AND ECCENTRIC BEARING AS UPPER PIN IS BEING WITHDRAWN.

- (k) Continue to rotate shaft counterclockwise until assembled retainer segments are drawn entirely into eccentric bearing and lateral brace.

CAUTION: CARE MUST BE EXERCISED TO ENSURE THAT RETAINER SEGMENTS ENGAGE BOTH SIDES OF LATERAL BRACE AND ECCENTRIC BEARING PRIOR TO REMOVING PIN. SIDE BRACE WEIGHS APPROXIMATELY 220 POUNDS.

- (l) Take up slack in portable hoist cable, and withdraw shaft, case, and side brace pin.

- (13) Disconnect upper side brace from lower side brace by removing side brace center pin as follows:

- (a) Remove center pin nut lock bolt (Ref. Fig. 403).
(b) Remove center pin nut and washer.
(c) Using slot wrench, install coupling on threaded end of center pin so that coupling is bottomed out on shoulder of pin (Ref. Fig. 403).
(d) Install removal shaft through case and insert shaft through center pin from head side.
(e) Screw shaft into coupling. Threads are left hand.

WARNING: CARE MUST BE EXERCISED TO ENSURE THAT COUPLING IS ENGAGING LOWER SIDE BRACE AND JURY BRACE AS CENTER PIN IS BEING WITHDRAWN.

- (f) Using wrench, turn drive shaft counterclockwise until pin has been withdrawn into case and is clear of lower side brace. Coupling must engage lower side brace and jury brace.

R EFFECTIVITY: ALL

001B

32-11-11
Page 407
May 15/85



(g) Disengage shaft from coupling by rotating shaft clockwise until clear of coupling. Remove pin from case.

(h) Lower and remove side brace.

B. Installation

(1) Coat inside diameter of bushings at both ends of upper side brace with grease.

(2) Hoist upper side brace into position. Grease fittings must point downward. Align lower end bushings with lower side brace bushing.

(3) Install side brace center pin as follows (Ref. Fig. 403):

(a) Coat side brace center pin with grease; insert pin through side brace lower bushing and screw into coupling. Head of pin must be toward forward end of aircraft. Coupling must be bottomed out on shoulder of pin.

(b) Install case on removal shaft and screw shaft into coupling until case bears against side brace bearing face.

(c) Using wrench, rotate shaft counterclockwise until center pin is drawn completely into place.

(d) Remove shaft, case, and coupling.

(e) Coat both faces of center pin washer with grease.

(f) Coat center pin threads with low adhesion sealing compound (Ref. 20-51-04).

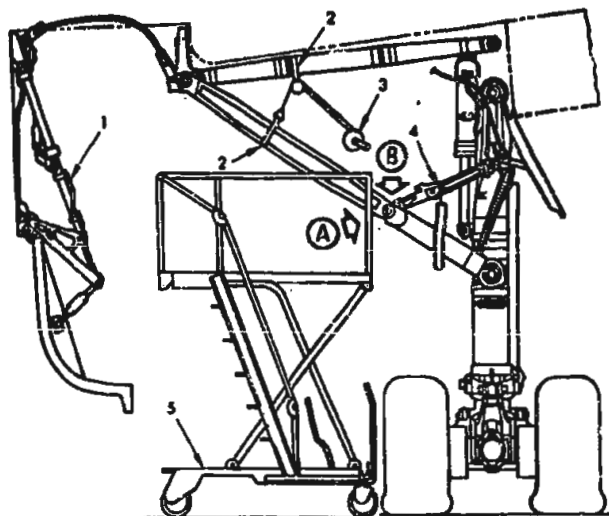
(g) Install washer and nut on center pin.

(h) Torque center pin to remove all end play; then decrease torque until lock bolt can be installed.

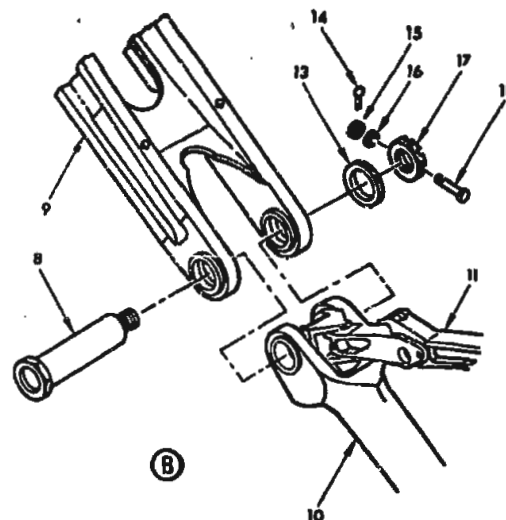
(i) Install lock bolt, washer, nut, and cotter pin.

(4) Install side brace upper pin as follows (Ref. Fig. 402):

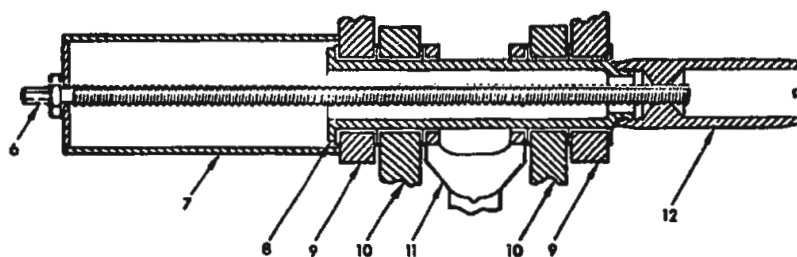
(a) Align side brace upper bushings with lateral brace bushings.



MAIN LANDING GEAR
VIEW LOOKING AFT-LEFT SIDE

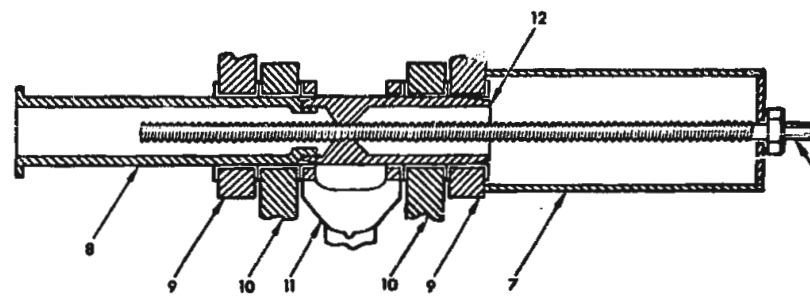


- 1 NLG ACTUATOR LOCK
- 2 NYLON STRAP
- 3 PORTABLE HOIST
- 4 DOWNLOCK SAFETY PIN
- 5 MAINTENANCE PLATFORM
- 6 REMOVAL SWIFT
- 7 CASE
- 8 CENTER PIN
- 9 UPPER SIDE BRACE
- 10 LOWER SIDE BRACE
- 11 JURY BRACE
- 12 COUPLING
- 13 CENTER PIN WASHER
- 14 COTTER PIN
- 15 NUT
- 16 WASHER
- 17 CENTER PIN NUT
- 18 LOCK BOLT



CENTER PIN REMOVAL

(A)



CENTER PIN INSTALLATION

(A)

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Upper Side Brace Center Pin - Removal and Installation Figure 403

32-11-11
Page 409/410
May 15/74

EFFECTIVITY: ALL



- (b) Coat side brace upper pin with grease; insert pin through side brace upper bearing and screw into segmented retainer. Retainer must be bottomed out on shoulder of pin.
- (c) Install nut on installer shaft and insert shaft into pin from head end.
- (d) Install bearing (tool) on opposite end of shaft and secure in place by installing stop. Lock stop in place with attached pin.
- (e) Using wrench, rotate shaft clockwise until open-end segment bottoms out inside bearing.
- (f) Remove stop and bearing (tool) and remove open-end segment.
- (g) Repeat Steps (e) and (f) to remove center and bolt-end segments, then continue to insert pin until pin head bottoms out against side brace bushing.
- (h) Remove stop, bearing (tool) installer shaft, and nut (tool).
- (i) Coat both faces of upper pin washer with grease.
- (j) Coat upper pin threads with low adhesion sealing compound (Ref. 20-51-04).
- (k) Install washer and nut on upper pin.
- (l) Tighten nut to eliminate any gap. Do not tighten beyond snug fit.
- (m) Install lock bolt, washer, nut, and cotter pin to safety upper pin nut.
- (5) Connect link for phase control flexible control (Ref. Fig. 402).
- (6) Install landing gear up position sensor target bracket (Ref. Fig. 402).
- (7) Reconnect hydraulic lines and secure clamps disconnected and removed in Steps 4A(9) and (10).
- (8) Pressure-lubricate all joints affected by this procedure (Ref. 12-24-01).
- (9) Remove maintenance platform.

R EFFECTIVITY: ALL
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MAINTENANCE MANUAL

- (10) Remove MLG inboard door actuator lock and close door (Ref. 32-10-00).
- (11) Retract and extend gear with reduced pressure and at slow speed. Check for ease of operation, and inspect for rubbing or chafing between the main landing gear upper side brace and trailing edge intercostal (Ref. 32-30-00). If any indications of chafing or rubbing are found, rework in accordance with SB 57-051.
- (12) Lower aircraft and remove jacks (Ref. 7-11-00).

R EFFECTIVITY: ALL

001B

32-11-11
Page 412
May 15/85

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR LOWER SIDE BRACE - REMOVAL AND INSTALLATION

1. General

This procedure is for removal and installation of a left-hand lower side brace assembly. The removal and installation procedure for the right-hand assembly is identical.

To select the proper support strap size, use the following weight values: MLG upper side brace 190 lb, MLG lower side brace 94 lb, and MLG jury brace assembly 60 lb.

2. Equipment and Materials

Nylon support straps, or equivalent

MLG Side Brace Pin Replacement Tool Set, PN B967-101, or equivalent

R Downlock Spring Tool Assembly, Dwg. No. B698, or equivalent
Cotter Pin, MS 24665-153, or equivalent

R Grease, Ref. MM12-20-00, Lubrication, Scheduled Servicing
Solvent, Dry Cleaning, Fed Spec P-D-680, or equivalent
Cold-application, Solvent Cutback, Corrosion Preventive Compound, MIL-C-16173, Grade 4, or equivalent

3. Referenced Procedures

7-11-00	Wing and Fuselage Jacking - Maintenance Practices
9-11-00	Normal Towing Conditions - Maintenance Practices
20-12-01	Application of Corrosion Preventive Materials
32-10-00	Main Landing Gear Inboard Door - Maintenance Practices
32-11-20	Main Landing Gear Downlock Springs - Removal and Installation
32-32-02	Main Landing Gear Jury Brace Actuator - Removal and Installation

EFFECTIVITY: ALL

0018

32-11-12
Page 401
May 15/85

LOCKHEED
MAINTENANCE MANUAL

4. Removal/Installation

A. Removal

- (1) Verify installation of left and right downlock safety pins (Ref. 9-11-00).
- (2) Open MLG inboard doors and install actuator lock (Ref. 32-10-00).
- (3) Jack aircraft until wheels clear the floor (Ref. 7-11-00).
- (4) Remove MLG downlock springs (Ref. 32-11-20).
- (5) Remove MLG jury brace actuator at lower attach point only (Ref. 32-32-02).

NOTE: Do not disconnect hydraulic hoses from actuator, this will prevent requirement to bleed hydraulics.

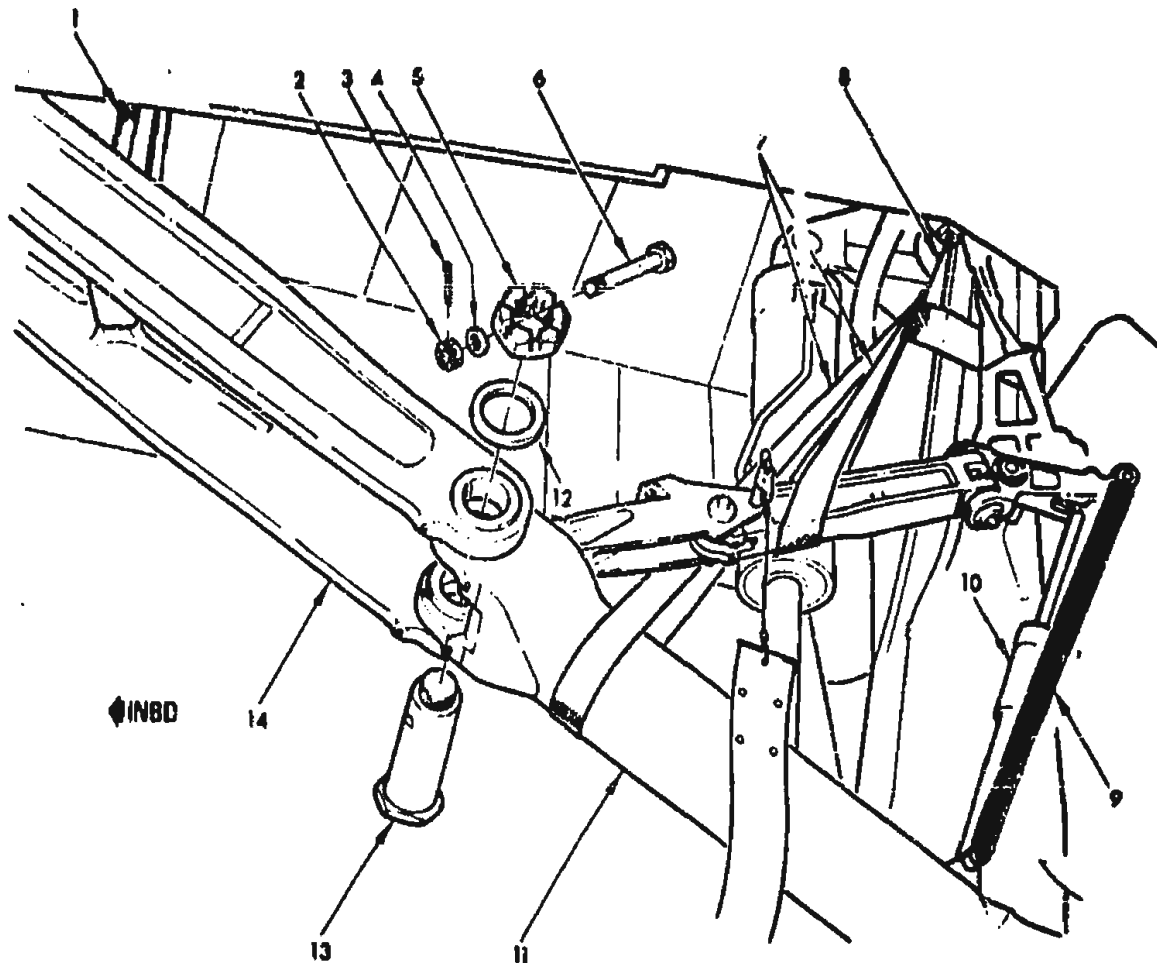
- (6) Secure upper side brace to lateral brace with nylon strap that can be adjusted to raise upper side brace out of the work area (Ref. Fig. 401).
- (7) Secure MLG lower side brace and jury brace assemblies to yoke of MLG shock strut with nylon straps (Ref. Fig. 401).
- (8) Remove lockbolt from brace pin nut. Remove nut.
- (9) Using side brace pin replacement tool, remove the side brace pin as follows:
 - (a) Using the tool set slot wrench, install guide on threaded end of side brace pin. Tighten guide to bottom out on shoulder of pin.
 - (b) Insert drive shaft screw through side brace pin and engage threads in guide.
 - (c) Turn drive shaft screw counterclockwise until adapter cage engages flange of side brace bushing.
 - (d) Continue to turn drive shaft screw counterclockwise until pin has been withdrawn into adapter cage and is clear of lower side brace, and until guide has engaged lower side brace and jury brace.

EFFECTIVITY: ALL

32-11-12
Page 402
May 15/85

001B

LOCKHEED
MAINTENANCE MANUAL



- | | |
|-----------------|-------------------------------------|
| 1 STRAP | 8 SHOCK STRUT YOKE (REF.) |
| 2 NUT | 9 DOWN LOCK SPRINGS (2 PLACES REF.) |
| 3 COTTER PIN | 10 JURY BRACE ACTUATOR (REF.) |
| 4 WASHER | 11 LOWER SIDE BRACE |
| 5 BRACE PIN NUT | 12 WASHER |
| 6 BOLT | 13 SIDE BRACE PIN |
| 7 STRAPS | 14 UPPER SIDE BRACE |

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R Main Landing Gear Lower Side Brace - Removal and Installation
R Figure 401

EFFECTIVITY: ALL

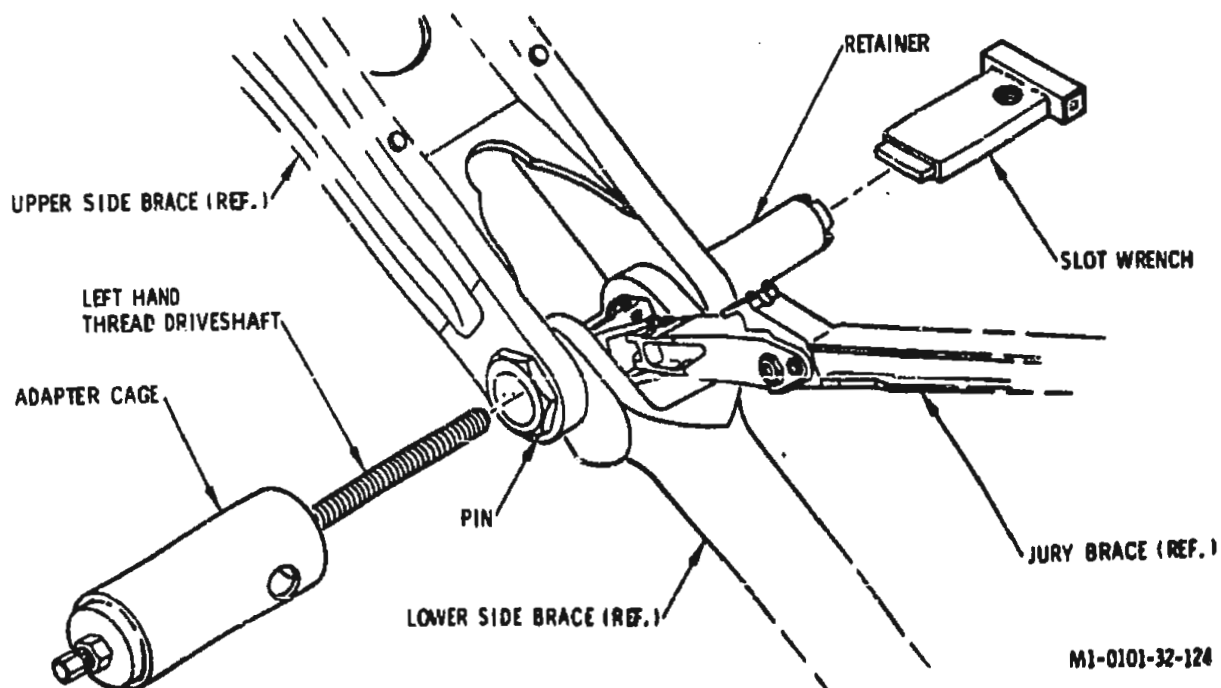
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32-11-12
Page 403
Dec 1/72



MAINTENANCE MANUAL

- (e) Disengage drive shaft screw from guide by turning drive shaft clockwise until clear. Remove pin from cage.
 - (f) Raise upper side brace until clear of joint by readjusting supporting straps.
 - (g) Reengage drive shaft of tool set with guide (Ref. Fig. 402) left installed in joint between lower side brace and jury brace assembly.
 - (h) Verify jury brace assembly and lower side brace are supported by their respective straps [Ref. Step 4A(7)].
 - (i) Turn drive shaft of tool set counterclockwise to remove guide and release jury brace assembly from lower side brace.
- (10) At the lower end of side brace, remove lockbolt from side brace adapter side brace nut (Ref. Fig. 403).
 - (11) Remove side brace nut, retaining lock, and snapping.
 - (12) Slide lower side brace off boss on shock strut.



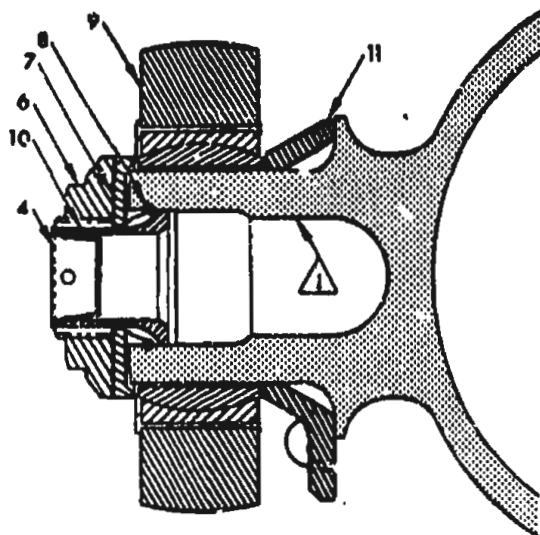
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Side Brace Pin - Removal and Installation
Figure 402

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32-11-12
Page 404
May 15/85

LOCKHEED
MAINTENANCE MANUAL



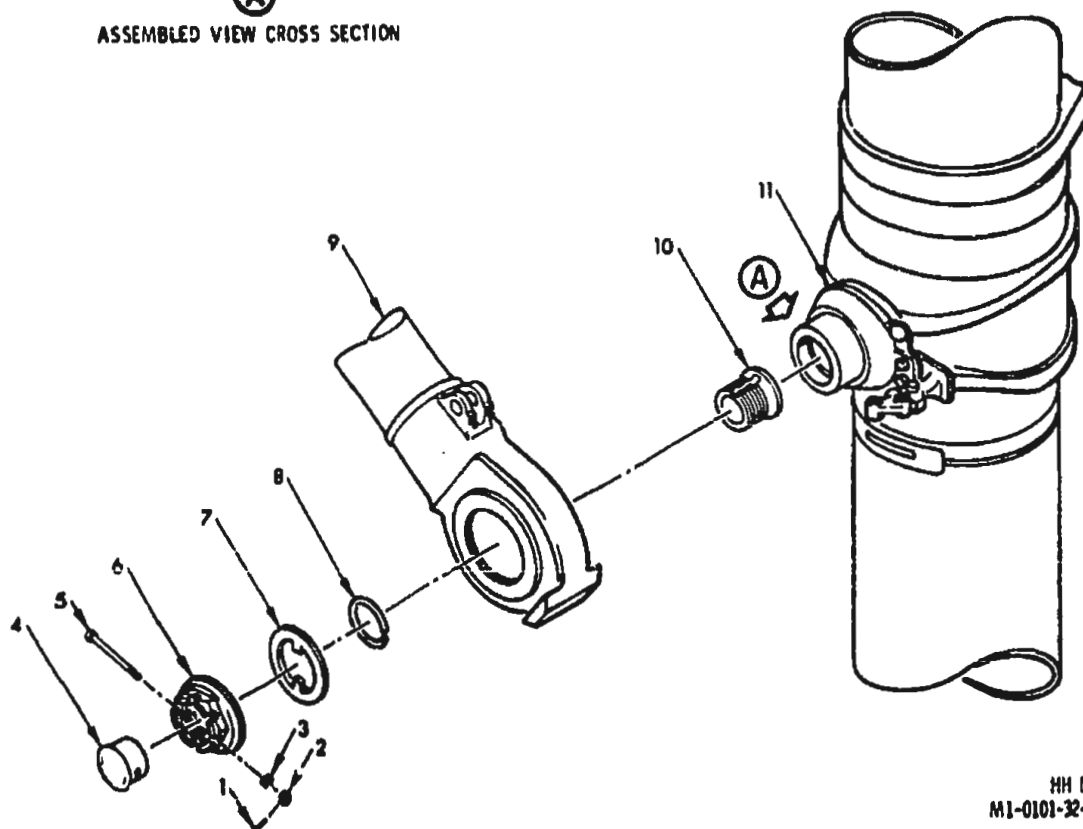
(A)

ASSEMBLED VIEW CROSS SECTION

- 1 COTTER PIN
- 2 NUT
- 3 WASHER
- 4 DUST CAP
- 5 BOLT
- 6 SIDE BRACE NUT
- 7 RETAINING LOCK
- 8 RING
- 9 LOWER SIDE BRACE
- 10 SIDE BRACE ADAPTER
- 11 SPACER

NOTE

△ COMPLETELY COAT INTERIOR WITH CORROSION PREVENTATIVE COMPOUND. COMPLETE ASSEMBLY WITHIN TWO HOURS OF APPLICATION OF COMPOUND ON ANY PART



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M1-0101-32-205

Main Landing Gear Side Brace to Shock Strut
Removal and Installation
Figure 403

R EFFECTIVITY: ALL
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32-11-12
Page 405
Dec 1/72

LOCKHEED
MAINTENANCE MANUAL

B. Installation

- (1) Thoroughly clean inside and outside of side brace boss on shock strut, spacer, side brace adapter, and ring with solvent to remove all old cold-application, solvent cutback, corrosion preventive compound (Ref. LCP78-1128).
- (2) Inspect groove inside brace boss on shock strut for excessive galling, pitting, burrs, or wear that may prevent the adapter lockring from seating properly.
- (3) Completely coat inside of side brace boss, side brace adapter, and ring with cold application, solvent cutback, corrosion-preventive compound (Ref. 20-12-01).

NOTE: Assembly of all parts coated with corrosion-preventive compound must be completed within 2 hours from time of application of compound on any part.

- (4) Coat the bearing surfaces of spacer with grease. Install spacer on the shock strut side brace boss (Ref. Fig. 403).
- (5) Hoist lower side brace into position with attaching lugs for downlock springs and jury brace actuator pointed upwards. Engage side brace with shock strut boss.
- (6) Install the side brace adapter, ring, and retaining lock. Ensure that ring is seated all the way around in the groove.
- (7) Coat threads and bearing surface of side brace nut with grease. Install nut. Torque nut 250 (± 10) lb ft. Back off nut only the amount needed to install lockbolt.
- (8) Install lockbolt, washer, nut, and cotter pin.
- (9) Pivot unattached end of lower side brace, upper side brace, and jury brace assembly toward each other to engage joining ends. Attach assemblies together with side brace pin, washer, and nut (Ref. Fig. 401).
- (10) Torquenut to remove all end play, then decrease torque until lock bolt can be installed.
- (11) Install lockbolt, washer, nut, and cotter pin (Ref. Fig. 401).

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EFFECTIVITY: ALL

32-11-12
Page 406
May 15/85

LOCKHEED



MAINTENANCE MANUAL

- (12) Install jury brace actuator (Ref. 32-32-02).
- (13) Install MLG downlock springs (Ref. 32-32-02).
- (14) Remove MLG door actuator lock and close MLG inboard door (Ref. 32-10-00).
- (15) Lower aircraft and remove jacks (Ref. 7-11-00).

R EFFECTIVITY: ALL
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32-11-12
Page 407/408
May 15/85



MAIN LANDING GEAR LATERAL BRACE ASSEMBLY
REMOVAL AND INSTALLATION

1. General

This procedure is for removal and installation of the left MLG lateral brace assembly. Removal and installation of the right assembly is identical.

2. Equipment and Materials

- R Grease, Ref. MM 12-20-00, Lubrication, Scheduled Servicing
- Low Adhesion Sealing Compound, LAC Spec C-40-769, Type II, or equivalent
- Corrosion Preventive Compound, MIL-C-16173, or equivalent
- Cotter Pin, MS24665-153, or equivalent
- Maintenance Platform (3 to 13 feet), Aircraft Equipment Co., Model 605, or equivalent
- Forward Fuselage Jack
- Wing Jack
- Jack Pad Adapters
- MLG Side Brace Tool Set, PN B967-101, or equivalent
- Nylon Strap Assemblies capable of supporting 500 pounds, or equivalent
- Wrench, MLG Side Brace Pin, PN BC73, or equivalent
- Wrench, MLG Side Brace Nut, PN BC74, or equivalent
- Wrench, MLG Side Brace Trunnion Cap Nut, PN 1308729-103, or equivalent
- Wrench, open end (1-7/16 inches)
- Kit, Sockets, MLG Side Brace, PN BC95
- Torque Wrench, PN TQ 1503L, or equivalent (1500 lb ft capacity)
- Portable Hoist, Wadell Equipment Co. Inc., PN WE3981, or equivalent

EFFECTIVITY: ALL



3. Referenced Procedures

7-11-00	Wing and Fuselage Jacking - Maintenance Practices
8-10-00	Leveling and Weighing - Maintenance Practices
9-11-00	Normal Towing Conditions - Maintenance Practices
10-10-00	Parking - Maintenance Practices
12-24-01	Main Landing Gear - Servicing
20-51-04	Environmental Sealing of Model L-1011 Airplane (PB75-425)
24-00-00	Electrical Power - Maintenance Practices
29-11-00	Hydraulic Power System - Maintenance Practices
32-33-00	Main Landing Gear Inboard Door - Maintenance Practices

4. Removal/Installation

A. Removal

R (1) Verify that all landing gear down-lock pins are
R installed (Ref. 10-10-00). (2) Ensure that flight
station landing gear control lever is in DOWN position.

R (3) Verify that hydraulic system C pressure is 0 psi,
R system C reservoir pressure is 0 psi, and system C
R accumulator pressure is 0 psi (Ref. 29-11-00).

NOTE: When positioning aircraft for jacking, ensure
that aircraft has traveled in a straight path
for a minimum distance of 15 feet to relieve
tire scrubbing loads and to prevent a side
preload on the landing gear (Ref. 9-11-00).

CAUTION: AIRCRAFT MUST BE LEVEL. WHEN JACKS ARE SET FOR
AIRCRAFT LEVEL CONDITION, THEY MUST NOT BE
DISTURBED UNTIL REPLACEMENT LATERAL BRACE IS
INSTALLED.

R (4) Jack aircraft at wing and fuselage jacking stations
until tires clear floor by approximately 6 inches (Ref.
7-11-00).

R (5) Verify aircraft is level (Ref. 8-10-00).

EFFECTIVITY: ALL



MAINTENANCE MANUAL

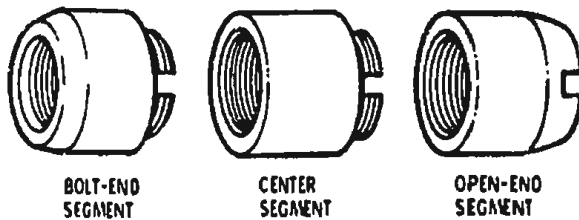
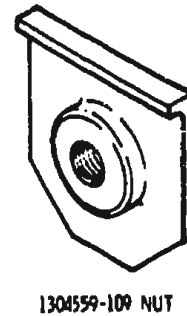
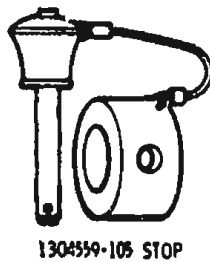
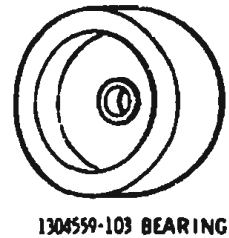
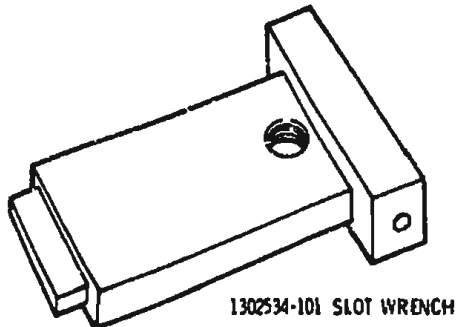
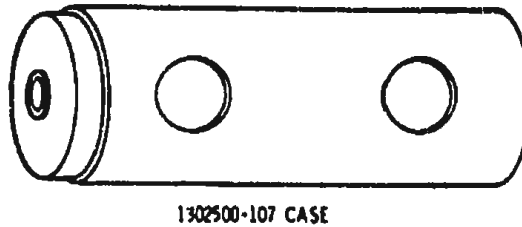
- R (6) Turn off electrical power (Ref. 24-00-00).
- R (7) Pull D-handle to open applicable MLG door.
- R (8) Install MLG inboard door actuator lock (Ref. 32-33-00).
- R (9) Ensure that hydraulic system C pressure is 0 psi, system C reservoir is 0 psi, and system C brake accumulator is 0 psi (Ref. 29-11-00).
- R (10) Place maintenance platform in position for access to lateral brace assembly.
- NOTE: Tools required to extract and insert the upper side brace pin are included in MLG side brace tool set, (Ref. Fig. 401).
- R (11) Remove target bracket from upper end of upper side brace (Ref. Fig. 402).
- NOTE: Some aircraft are configured such that hydraulic lines interfere with the upper side brace removal tools. If this is the case, these lines must be freed to permit displacements; perform Step (12). If not the case, proceed to Step (13).
- R (12) Remove clamps and fasteners from two hydraulic lines (Ref. Fig. 403) and disconnect LG ALTR DN hydraulic line. Cap and plug line connectors.
- R (13) Disconnect link from phase control valve flexible control at upper side brace inboard end (Ref. Fig. 403).
- R (14) Remove control bracket from inboard end of lateral brace. Move bracket and flexible control up out of work area, and secure.
- R (15) Rig a portable hoist adapter sling, portable hoist, and side brace sling to lateral brace and side brace (Ref. Fig. 402).
- CAUTION: OBSERVE DISASSEMBLY SEQUENCE AS WRITTEN. DO NOT REMOVE ECCENTRIC BEARING CAP BOLT NUTS PREMATURELY.
- DO NOT DISTURB SHIM STACK.
- R (16) Relieve load on eccentric bearing by backing off retaining bolts to remove bolt tension. Do not loosen bolts (Ref. Fig. 403).

EFFECTIVITY: ALL

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32-11-13
Page 403
May 15/85

LOCKHEED
MAINTENANCE MANUAL



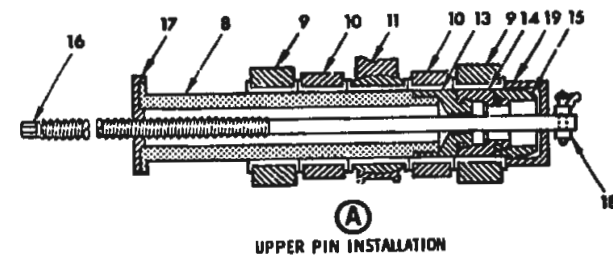
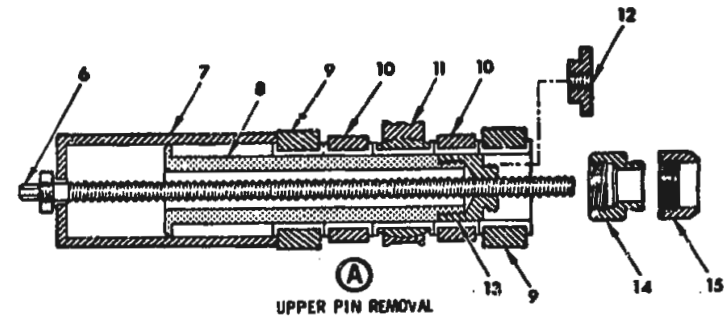
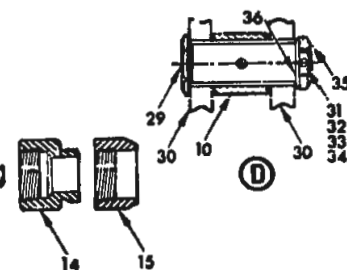
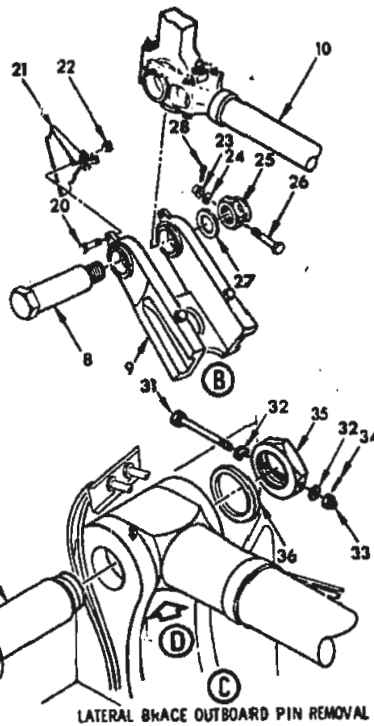
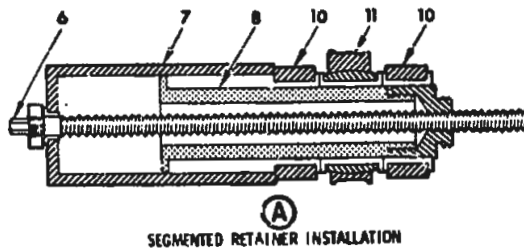
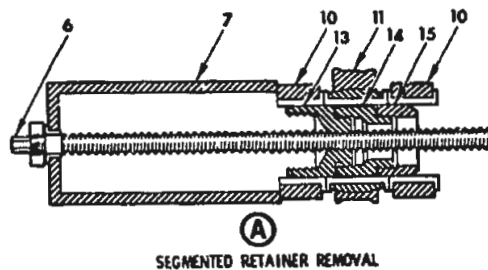
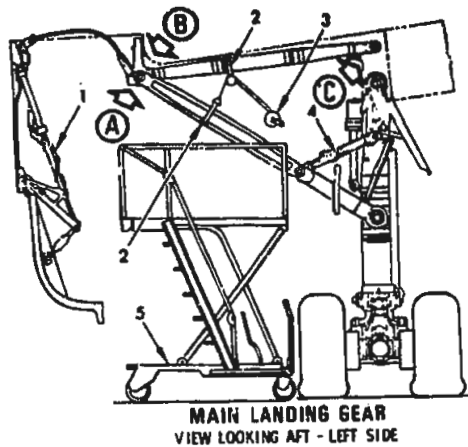
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Upper Side Brace Upper Pin Tools
Figure 401

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EFFECTIVITY: ALL

32-11-13
Page 404
Aug 15/74



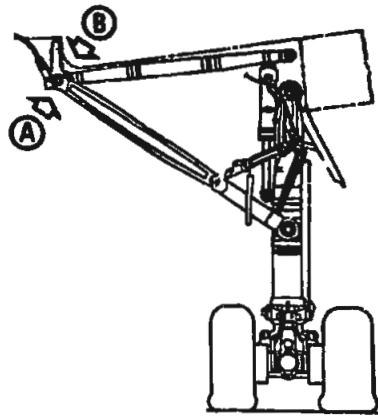
- | | |
|------------------------------|---------------------------------|
| 1 MLG DOOR ACTUATOR LOCK | 20 BOLT |
| 2 NYLON STRAP | 21 SENSOR TARGET BRACKET |
| 3 PORTABLE HOIST | 22 NUT |
| 4 DOWNLOCK SAFETY PIN | 23 NUT |
| 5 MAINTENANCE PLATFORM | 24 WASHER |
| 6 REMOVAL SHAFT | 25 UPPER PIN NUT |
| 7 CASE | 26 LOCKBOLT |
| 8 UPPER PIN | 27 UPPER PIN WASHER |
| 9 UPPER SIDE BRACE | 28 COTTER PIN |
| 10 LATERAL BRACE | 29 LATERAL BRACE OUTBOARD PIN |
| 11 ECCENTRIC BEARING | 30 LANDING GEAR SUPPORT FITTING |
| 12 STARTER | 31 LOCKBOLT |
| 13 BOLT-END RETAINER SEGMENT | 32 WASHER (2) |
| 14 CENTER RETAINER SEGMENT | 33 NUT |
| 15 OPEN-END RETAINER SEGMENT | 34 COTTER PIN (MS24665-153) |
| 16 INSTALLER SHAFT | 35 OUTBOARD PIN NUT |
| 17 NUT | 36 SPACER |
| 18 STOP | |
| 19 BEARING | |

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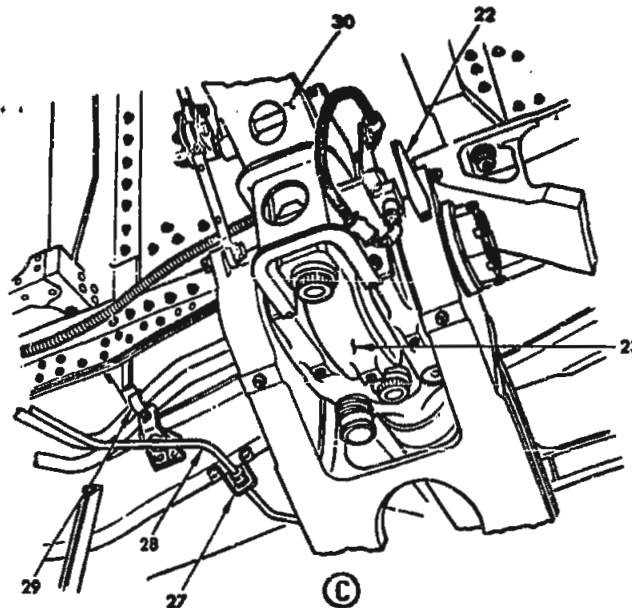
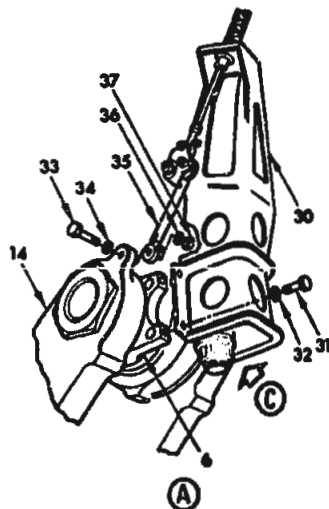
Lateral Brace - Removal and Installation
Figure 402

EFFECTIVITY: ALL

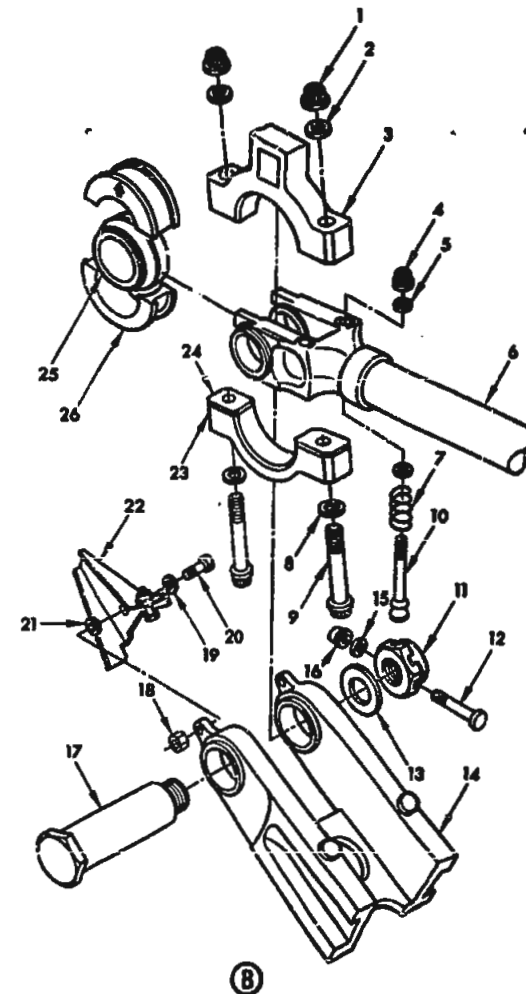
32-11-13
Page 405/406
May 15/77



MAIN LANDING GEAR



- | | |
|------------------------------|------------------------------------|
| 1 NUT (2) | 20 BOLT |
| 2 WASHER (2) | 21 SPACER |
| 3 SIDE BRACE SUPPORT FITTING | 22 TARGET BRACKET |
| 4 NUT | 23 ECCENTRIC BEARING RETAINING CAP |
| 5 WASHER (2) | 24 SHIM (2) BONDED IN PLACE |
| 6 LATERAL BRACE | 25 BEARING BALL |
| 7 SPRING | 26 ECCENTRIC BEARING HALF |
| 8 WASHER (2) | 27 B-NUT |
| 9 BOLT (2) | 28 LG ALTR DN HYDRAULIC LINE |
| 10 BOLT | 29 CLAMP (2) |
| 11 NUT | 30 BRACKET |
| 12 BOLT | 31 BOLT |
| 13 WASHER | 32 WASHER |
| 14 UPPER SIDE BRACE | 33 BOLT |
| 15 WASHER | 34 WASHER |
| 16 NUT | 35 LINK |
| 17 SIDE BRACE PIN | 36 WASHER |
| 18 NUT | 37 NUT |
| 19 WASHER | |



ML-0103-32-234

Lateral Brace Inboard Attachment and Hydraulic Line Location
Figure 403

EFFECTIVITY: ALL

32-11-13
Page 407/408
May 15/77

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MAINTENANCE MANUAL

- R** **(17)** Using MLG side brace tool set, remove upper side brace pin as follows (Ref. Fig. 402):
- (a) Remove side brace pin nut lockbolt.
 - (b) Remove side brace pin nut and washer.
 - (c) Install removal shaft through case and insert shaft through pin from head side.
 - (d) Position starter at threaded end of pin and screw shaft into starter. Threads are left hand.
 - (e) Using wrench, turn shaft counterclockwise until starter is drawn in flush with side brace bearing face.
 - (f) Turn shaft clockwise until starter is exposed enough to permit removal from shaft. Remove starter.
 - (g) Using slot wrench, install bolt-end retainer segment onto threaded end of pin.

CAUTION: IF ECCENTRIC BEARING CAP IS SECURED USING PARTS COATED WITH MOLYBDENUM DISULFIDE AND CETYL ALCOHOL, CARE MUST BE EXERCISED TO PREVENT CONTACT WITH GREASE.

- (h) Coat outside diameter of bolt-end retainer segment with grease.
- (i) Rotate shaft counterclockwise until bolt-end retainer segment is drawn far enough into side brace to assemble center segment onto bolt-end segment. Grease center segment.
- (j) Rotate drive shaft until center segment is drawn into side brace far enough to permit installation of open-end segment onto center segment. Grease open-end segment.

WARNING: CARE MUST BE EXERCISED TO ENSURE THAT SEGMENTED RETAINER IS ENGAGING LATERAL BRACE AND ECCENTRIC BEARING AS UPPER PIN IS BEING WITHDRAWN.

- (k) Continue to rotate shaft counterclockwise until assembled retainer segments are drawn entirely into eccentric bearing and lateral brace.

EFFECTIVITY: ALL

001B

32-11-13
Page 409
May 15/85

LOCKHEED
MAINTENANCE MANUAL

- (l) Take up slack in portable hoist cable and withdraw shaft, case, and side brace pin.

CAUTION: UPPER SIDE BRACE WEIGHT IS APPROXIMATELY 220 POUNDS.

- (m) Using hoist, lower inboard end of upper side brace to workstand.

CAUTION: WEIGHT OF LATERAL BRACE IS APPROXIMATELY 150 POUNDS. AS LATERAL BRACE PIVOTS ABOUT OUTBOARD ATTACHMENT PIN WHEN LOWERED TO WORK STAND CARE MUST BE EXERCISED TO PREVENT CONTACT WITH ANY SURROUNDING STRUCTURE.

- R (18) Disconnect and remove lateral brace as follows (Ref. Fig. 403):
- (a) Use sufficient number of personnel to support lateral brace while retainer segments are withdrawn from eccentric bearing and lateral brace.
 - (b) Screw removal shaft with case into retainer segments until case is bearing against lateral brace bearing face.
 - (c) Continue to turn shaft counterclockwise until retainer segments are withdrawn from lateral brace and eccentric bearing. Remove shaft, case, and retainer segments, and lower lateral brace inboard end to workstand.
 - (d) Remove lateral brace outboard pin nut and spacer.
 - (e) Use sufficient number of personnel to support lateral brace and remove outboard pin.
 - (f) Lower lateral brace to workstand.

- R (19) If eccentric bearing retaining cap must be removed, proceed as follows:

CAUTION: THE SIDE BRACE SUPPORT FITTING AND RETAINING CAP ARE MACHINED TOGETHER AND ARE A MATCHED PAIR. PRIOR TO REMOVING THE RETAINING CAP, THE CAP AND FITTING MUST BE MARKED TO ENSURE INSTALLATION IN THE SAME LOCATION FROM WHICH THE CAP WAS REMOVED.

- (a) Remove nuts and washers while holding bolts in cap. Use nut wrench PN 1308729 (Ref. Fig. 404).

EFFECTIVITY: ALL

001B

32-11-13
Page 410
May 15/85

LOCKHEED
MAINTENANCE MANUAL

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CAUTION: WIRE TOGETHER AND TAG ALL PARTS OF SIDE BRACE BEARING AND MAINTAIN AS A MATCHED SET FOR REINSTALLATION.

- (b) Remove cap and bolts while maintaining shim stack position.

B. Installation

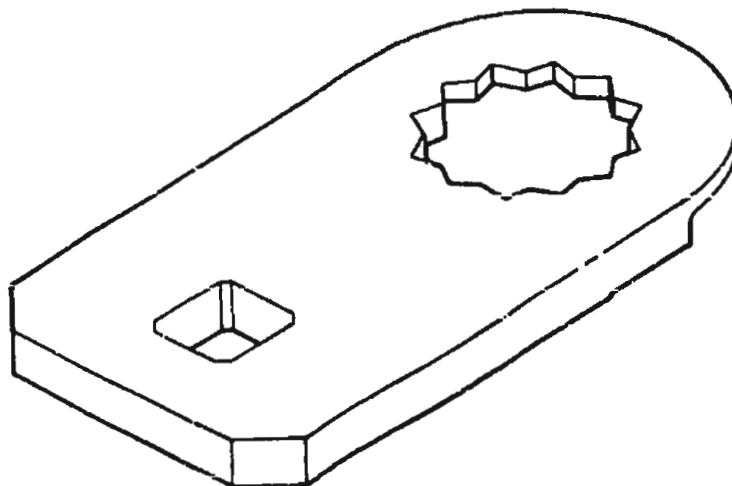
- (1) Verify that aircraft is on jacks in a level attitude (Ref. 8-10-00).

NOTE: If shims have not been mislocated, or if the same bearing will remain installed, omit Steps (2) through (12).

If shims have been mislocated or displaced, and if bearing is being replaced, proceed with Step (2).

- (2) Using a micrometer, measure the OD of eccentric bearing assembly. Record reading. Check Wear limits of bearing ball sleeve bushing (Ref. Fig.406).

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UPPER SIDE BRACE TRUNNION BEARING CAP NUT WRENCH

M1-0100-32-487

Main Landing Gear Side Brace Trunnion Cap Nut Wrench
Figure 404

EFFECTIVITY: ALL

001B

32-11-13
Page 411
Nov 15/85



CAUTION: TO PREVENT DISTORTION OF WASHER AND ABNORMAL STRESS ON BOLT HEAD, COUNTERSUNK WASHER MUST BE POSITIONED WITH COUNTERSUNK SIDE BEARING AGAINST BOLT HEAD.

- (3) Position eccentric bearing retaining cap, with shims, on MLG side brace inboard support fitting. Install cap retaining bolts, nuts, and washers. Tighten bolts to a torque of 1200 (± 120) lb in. (100 ± 10 lb ft) in increments of 400 lb in. (33 lb ft).

NOTE: The amount of bolt protruding beyond nut must be 0.167 inch minimum (Ref. Fig. 405).

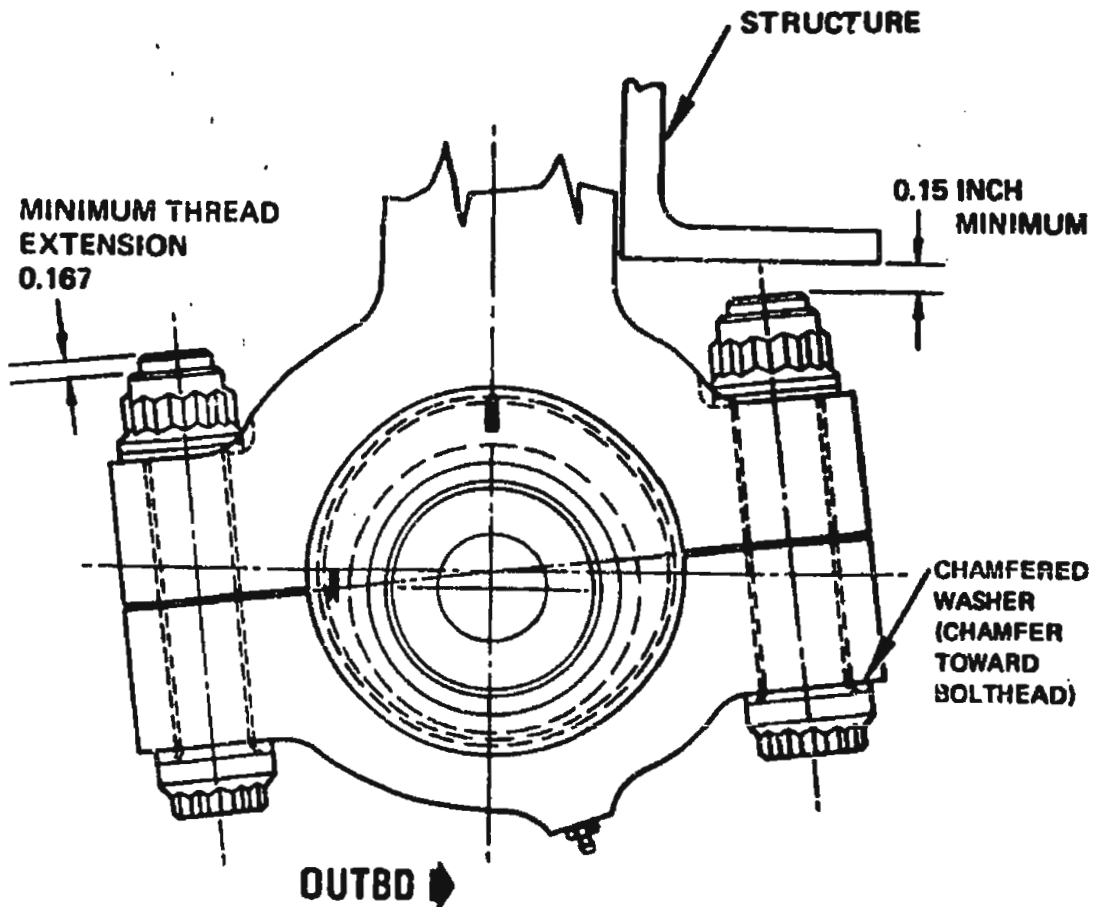
- (4) Measure clearance between outboard bolt and structure (Ref. Fig. 405). If clearance is less than 0.15 inch, add a plain, flat washer between chamfer washer and bearing cap as necessary to provide minimum clearance.
- (5) Remove or add shim laminations equally at both sides of fitting-cap junction to obtain an inside bearing cavity diameter of 0.009 (± 0.0015) inch less than bearing OD. Diameter must be measured while cap retaining bolts are torqued to 1200 (± 120) lb in. and perpendicular to split line. Shim laminations are 0.002 inch.
- (6) To ensure matched pairs, verify that serial numbers on eccentric bearing halves are identical and that etch marks on bearing halves are on same side and opposite each other.
- (7) Assemble bearing halves and ball sleeve with match marks aligned.

CAUTION: VERIFY THAT SHIM LAMINATIONS WERE REMOVED EQUALLY FROM EACH SIDE OF BEARING CAP TO OBTAIN A DIMENSION OF THE BEARING CAVITY ID THAT IS 0.009 (± 0.0015) INCH LESS THAN OD OF ECCENTRIC BEARING.

DO NOT PERMIT BEARING BOLTS, NUTS, AND WASHERS, COATED WITH DRY LUBRICANT, TO COME IN CONTACT WITH GREASE.

- (8) Coat OD of bearing outer race and bearing ball with grease.
- (9) Install assembled eccentric bearing into MLG side brace inboard support fitting with index arrow pointing upward. Ensure that correct shims are in place on both sides of bearing between bearing cap and side brace support fitting.

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MAINTENANCE MANUAL



UPPER SIDE BRACE SUPPORT FITTING

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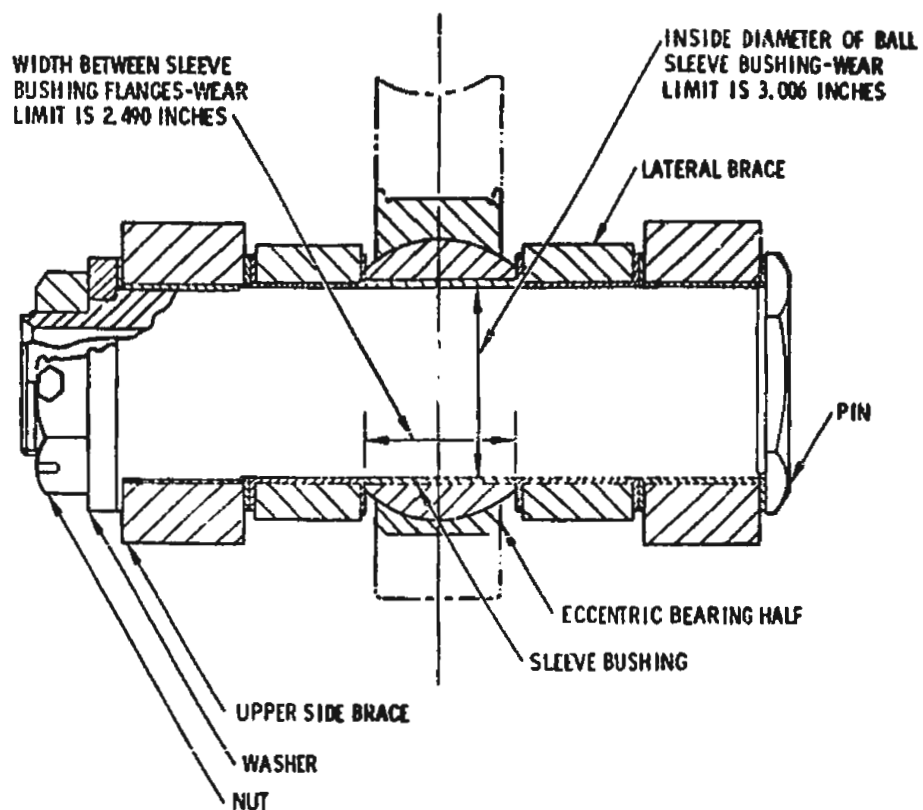
Upper Side Brace Support Clearances
Figure 405

EFFECTIVITY: ALL

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32-11-13
Page 413
Sep 15/80

LOCKHEED
MAINTENANCE MANUAL



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Bearing Ball Sleeve Bushing Wear Limits
Figure 406

EFFECTIVITY: ALL

001B

32-11-13
Page 414
Nov 15/85



MAINTENANCE MANUAL

CAUTION: TO PREVENT DISTORTION OF WASHER AND ABNORMAL STRESS ON BOLT HEAD, COUNTERSUNK WASHER MUST BE POSITIONED WITH COUNTERSUNK SIDE BEARING AGAINST BOLT HEAD.

- (10) Install bolts with heads down, install washers, and secure with nuts but do not torque at this time. Bearing assembly must be free to rotate in cavity.

CAUTION: DO NOT PERMIT BEARING CAP BOLTS, NUTS, AND WASHERS, COATED WITH DRY LUBRICANT, TO COME IN CONTACT WITH GREASE.

- (11) Coat the OD and face of lateral brace outboard pin, ID of MLG support fitting bearing, and lateral brace bearings with grease.
- (12) In preparation for installation of lateral brace outboard pin, move lateral brace into position. Grease fittings must face downward and upstop snubber bumper pad must be in aft location.
- (13) Install outboard pin. Coat threads of pin with sealing compound and install spacer, nut, and lockbolts (Ref. Fig. 402). Safety lockbolt with cotter pin.

CAUTION: DO NOT DRIVE PIN INTO POSITION.

- (14) Position inboard end of lateral brace to align inboard bearings with eccentric bearing. Rotate eccentric bearing index arrow a maximum of 90 degrees in either direction starting from the upward position to insert the upper side brace pin. Coat pin with grease and, using as little force as possible, insert upper side brace pin into lateral brace and eccentric bearing.

NOTE: The index arrow on the eccentric bearing must be kept in the upper quadrants to allow clearance between the forward clevis lug of the side brace and the 1/2 inch diameter vertical bolt through the structure above.

- (15) Using a minimum torque of 250 to 450 lb in. (21 to 38 lb ft), draw bearing cap bolts up evenly, maintaining equal gaps at bearing cap inboard and outboard lugs. When bearing cap is seated, use running to draw bolts up in 500 lb in. (42 lb ft) increments to 3000 lb in. (250 lb ft). Then complete tightening to a torque of 8500 to 9000 lb in. (710 to 750 lb ft). Hold nut with wrench (Ref. Fig. 404).



MAINTENANCE MANUAL

- (16) Install bolt-end retainer segment on side brace pin; use removal shaft and case to draw all three retainer segments into lateral brace and bearing (Ref. Fig. 402). Remove side brace pin.
- (17) Rig portable hoist from lateral brace in preparation to hoist upper side brace.

CAUTION: BEARING CAP IS SECURED WITH DRY LUBRICANT COATED BOLTS, NUTS, AND WASHERS. ENSURE THAT THERE IS NO CONTACT WITH GREASE.

- (18) Coat ID of upper side brace bearing with grease.
- (19) Hoist upper side brace into position so that side brace bearing bore is aligned with lateral brace bearing, bore.
- (20) Install side brace pin as follows (Ref. Fig. 402):
- (a) Coat OD of side brace pin with grease.
 - (b) Insert side brace upper pin through side brace upper bearing and screw into segmented retainer. Retainer must be bottomed out on shoulder of pin.
 - (c) Install nut on installer shaft and insert shaft into pin from head end.
 - (d) Install bearing (tool) on opposite end of shaft and secure in place by installing stop. Lock stop in place with attached pin.
 - (e) Using wrench, rotate shaft clockwise until open-end segment bottoms out inside bearing.
 - (f) Remove stop and bearing (tool), then remove open-end segment.
 - (g) Repeat Steps (e) and (f) to remove center and bolt-end segments, then continue to insert pin until pin head bottoms out against side brace bushing.
 - (h) Remove stop, bearing, installer shaft, and nut.
 - (i) Coat both faces of side brace pin washer with grease.
 - (j) Coat side brace pin threads with low adhesion sealing compound (Ref. 20-51-04).



- (k) Install washer and nut on side brace pin.
- (l) Tighten nut to eliminate any gap. Do not tighten beyond snug fit.
- (m) Install lock bolt, washer, nut, and cotter pin to safety upper pin nut.
- (21) Install control bracket for flexible control on inboard end of lateral brace.
- (22) Connect link for phase control flexible control at upper side brace inboard end.
- (23) Install landing gear up sensor target bracket on upper end of upper side brace.
- (24) Pressure-lubricate all joints affected by this procedure (Ref. 12-24-01).
- (25) Remove maintenance platform.
- (26) Remove inboard door actuator lock and close door (Ref. 32-33-00).
- (27) Lower aircraft and remove jacks (Ref. 7-11-00).

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MAINTENANCE MANUAL

MAIN LANDING GEAR JURY BRACE ASSEMBLY - REMOVAL AND INSTALLATION

1. General

This procedure contains instructions for removing and installing the MLG jury brace assembly. The junction between the upper side brace and the lower side brace is left intact.

2. Equipment and Materials

- R Cotter Pin, MS24665-153, or equivalent
 Cotter Pin, MS24665-300, or equivalent
 Ladder, 8-foot platform or equivalent
- R Grease, Ref. MM 12-20-GO, Lubrication, Scheduled Servicing
 Landing Gear Installation Tool Kit, Dwg No. 151854-907 MST, or equivalent
- R Low Adhesion Sealing Compound, LAC Spec C-40-769, Type II, or equivalent

3. Referenced Procedures

- R 20-51-04 Environmental Sealing of Model L-1011 Airplane
 (PB75-425)
- 29-11-00 Hydraulic Power System - Maintenance Practices
- 32-10-00 Main Landing Gear Inboard Door - Maintenance Practices
- R 32-11-20 Main Landing Gear Downlock Springs - Removal and
R Installation

4. Removal/Installation

A. Removal

- (1) Install NLG downlock safety pins.
- (2) Install MLG downlock safety pin in landing gear from which the jury brace is not being removed.

EFFECTIVITY: ALL

002B

32-11-14
Page 401
May 15/85



MAINTENANCE MANUAL

- R
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- (3) Ensure that flight station landing gear control lever is in DOWN position.
 - (4) Pull applicable D-handle to open MLG door and install MLG inboard door actuator lock (Ref. 32-10-00).
 - (5) Remove jury brace actuator at upper attachment only. Do not disconnect hydraulic hose (Ref. 32-32-02).
 - (6) Ensure that hydraulic system C pressure to 0 psi (Ref. 29-11-00).
 - (7) Remove MLG downlock sensor and disconnect conduit from jury brace assembly.
 - (8) Remove jury brace actuator and springs (Ref. 32-32-02).
 - R (9) Disconnect jury brace from upper and lower side braces as follows (Ref. Fig. 401):
 - (a) Support upper side brace to lateral brace, using a strap or sling.
 - (b) Remove lockbolt from side brace pin nut.
 - (c) Remove nut and washer from side brace pin.
 - NOTE: The MLG side brace pin replacement tool set, used to remove the side brace pin, is part of the landing gear installation tool kit.
 - (d) Using tool set slot wrench, install guide on threaded end of side brace pin. Tighten guide to bottom out on shoulder of pin.
 - (e) Insert drive shaft screw through side brace pin and engage threads in guide.
 - (f) Turn drive shaft screw counterclockwise until adapter cage engages flange of side brace bearing.
 - (g) Continue to turn drive shaft screw counterclockwise until guide is into upper and lower side brace bushings on nut side of brace (approximately 2 inches).
 - (h) Disengage drive shaft screw from guide by turning drive shaft clockwise until clear.

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32-11-14
Page 402
May 15/85

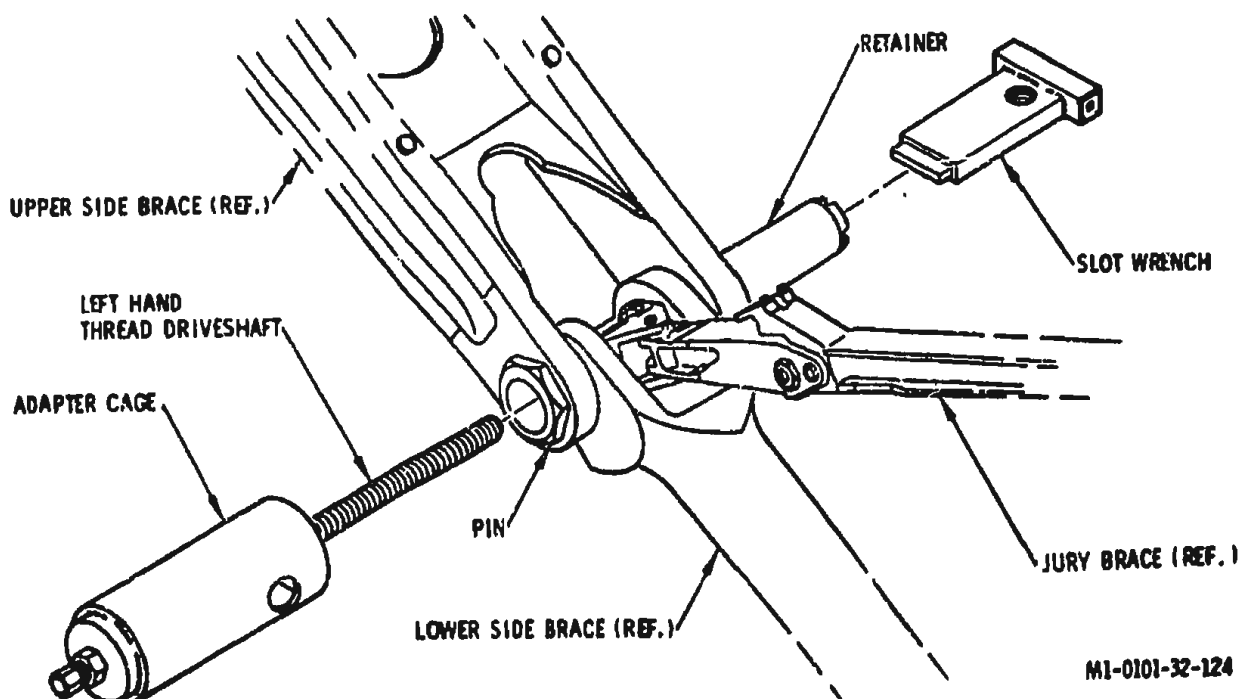
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- (i) Using the tool set slot wrench to prevent the guide from rotating and a wrench to turn the side brace pin, disconnect side brace pin from guide.
 - (j) Remove side brace pin just far enough to clear jury brace lugs.
 - (k) Lift jury brace assembly clear of side braces.
 - (10) Disconnect jury brace from MLG strut as follows (Ref. Fig. 401):
 - (a) Remove retaining bolt from MLG strut boss.
 - (b) Support jury brace assembly and then remove upper pin and spacer.
- NOTE: Pin plug may come out when pin is removed.
- (c) Remove jury brace assembly.

B. Installation

- (1) Clean all old grease and dirt from upper pin, plug, and inside of boss.

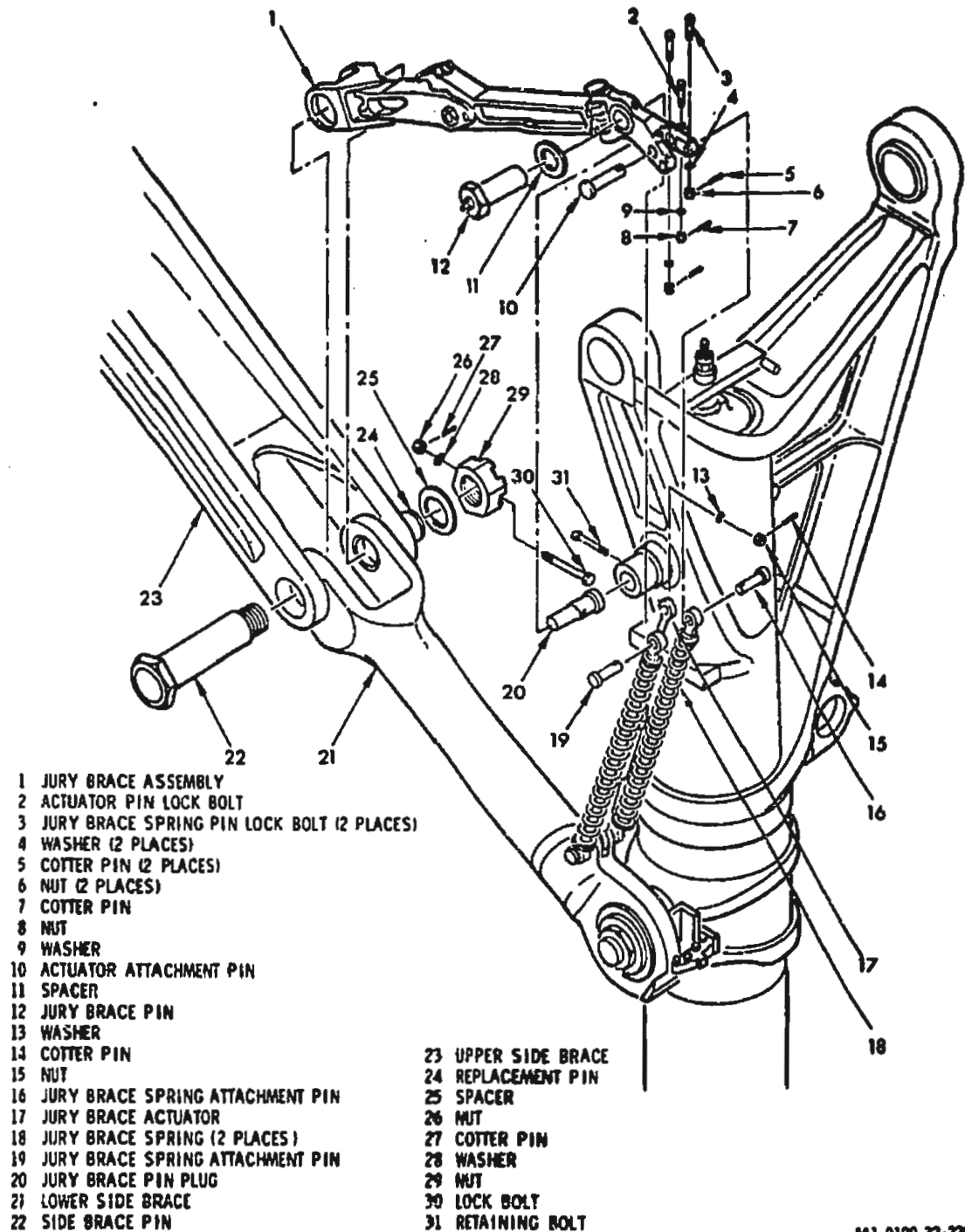


Side Brace Pin - Removal and Installation
Figure 401

EFFECTIVITY: ALL

002B

32-11-14
Page 403
May 15/90



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Main Landing Gear Jury Brace - Removal and Installation
 Figure 402

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EFFECTIVITY: ALL

32-11-14
 Page 404
 May 15/85



- (2) Coat plug with grease and insert plug in boss.
- (3) Connect jury brace assembly to strut as follows:
 - (a) Coat upper pin with grease.
 - (b) Position jury brace assembly on face of boss and insert pin.
 - (c) Install retaining bolt, washer, and nut.
 - (d) Tighten nut and safety with cotter pin, MS24665-300, or equivalent.
- (4) Connect jury brace to upper and lower side braces as follows:
 - (a) Coat side brace pin bearing surface with grease.
 - (b) Position jury brace assembly in upper and lower side brace junction.
 - (c) Insert side brace pin through upper and lower side brace bearings until pin can be screwed into tool set guide.
 - (d) Using tool set slot wrench on guide and a wrench on pin, screw pin into guide until guide is bottomed out on pin shoulder.
 - (e) Screw drive shaft into guide, turning counterclockwise, until cage bears against upper side brace bearing shoulder.

CAUTION: WHEN TURNING DRIVE SHAFT TO DRAW SIDE BRACE PIN INTO JUNCTION, ENSURE THAT PIN IS MOVING INWARD. NO MOVEMENT INDICATES THAT GUIDE IS BEING UNSCREWED FROM PIN, WHICH MAY RESULT IN DAMAGE TO PIN THREADS.

 - (f) Continue to turn drive shaft counterclockwise until side brace pin is drawn completely into upper and lower side brace junction. Remove guide.
 - (g) Clean grease from side brace pin threads.
 - (h) Coat both faces of spacer with grease.
 - (i) Install spacer on pin.

LOCKHEED



MAINTENANCE MANUAL

- (j) Coat threads of pin with low adhesion sealing compound (Ref. 20-51-04).
- (k) Install side brace pin nut on pin. Torque nut to decrease all end play, then decrease torque until lockbolt can be installed.
- (l) Install lockbolt, washer, and nut. Safety with cotter pin, MS24665-153, or equivalent.
- (5) Install jury brace actuator and springs (Ref. 32-32-02 and 32-11-20).
- (6) Install MLG downlock sensor and secure conduit to jury brace.
- (7) Remove strap from upper side brace and lateral brace.
- (8) Close MLG inboard door and remove MLG door actuator lock (Ref. 32-10-00).

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EFFECTIVITY: ALL

32-11-14
Page 406
May 15/90

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR FORWARD AND AFT TRUNNION PINS - INSPECTION AND
CHECK

1. Equipment and Materials

Trichloroethylene solvent, Federal Spec. P-D-680 or O-T-634, or equivalent

R Corrosion Preventative Compound, MIL-C-16173, Grade I, or
R equivalent

R Grease, MIL-G-23827A or equivalent

2. Referenced Procedures

R 6-40-00 Exterior Access Doors and Panels

32-11-01 Main Landing Gear Assembly - Removal and
Installation

32-11-02 MLG Shock Strut - Removal and Installation

3. INSPECTION/CHECK

A. INSPECTION

WARNING: ASSURE THAT SAFETY PINS ARE INSTALLED IN MAIN
LANDING GEAR (MLG) AND HOSE LANDING GEAR (NLG)
DOWN-LOCK MECHANISMS AND THAT NLG AND MLG WHEELS
ARE BLOCKED FORE AND AFT.

TAG LANDING GEAR CONTROL LEVER IN COCKPIT.

USE SOLVENT IN A WELL VENTILATED AREA. DO NOT
INHALE SOLVENT VAPORS OR ALLOW SOLVENT TO COME IN
CONTACT WITH THE SKIN. KEEP SOLVENT AWAY FROM
OPEN FLAME.

(1) Using a ladder enter the left and right MLG wells at
their outboard end and locate the MLG forward and aft
trunnions at the top of each main landing gear shock
strut (Ref. Fig. 601).

R (2) If trunnion pin retainers are installed, remove as
R follows:

R (a) Remove wing lower panels 541CB and 641CB aft of
R MLG strut well, (Ref. 6-40-00), and the triangular

EFFECTIVITY: ALL

32-11-17
Page 601
May 15/86



MAINTENANCE MANUAL

trunnion nut access panel on the beam directly aft of each MLG aft trunnion pin.

(b) At forward end of forward trunnion pin, restrain retainer shaft from rotating by means of a wrench at the forward wrenching hexagonal and loosen and remove nut from the aft end of shaft. Remove retainer cap and washer from aft end of shaft. At forward end of shaft, remove cotter pin, flathead pin and washer, and rotate retainer cap off forward end of shaft. Remove shaft by pulling it aft out of the aft end of the trunnion pin.

(c) At aft end of aft trunnion pin, restrain retainer shaft from rotating by means of a wrench at the aft wrenching hexagonal and loosen and remove nut from the forward end of shaft. Remove retainer cap and washer from forward end of shaft. Restrain shaft from rotating by means of a wrench at the forward wrenching hexagonal and rotate nut off aft end of shaft. Remove retainer cap and washer from aft end of shaft. Remove shaft by pulling it forward out of the forward end of the trunnion pin.

(3) Using Trichloroethylene solvent and a nylon brush and rags, remove all evidence of dirt or grease from the interior (bore) surface of each MLG forward and aft trunnion pin. Wipe the washer surface with clean, lint free cloths to assure that no residue remains on the painted surface that might compromise the result of the visual inspection (Ref. Fig. 601 and 602).

CAUTION: WITHIN THE WORKSCOPE OF THE DAILY CHECK IN MLG WHEEL WELL AREAS, VISUALLY CHECK RIGHT AND LEFT MLG FWD AND AFT TRUNNION PINS FOR PROTRUSION FROM WING MLG TRUNNION FITTINGS.

IF FWD PIN PROTRUSION IS OBSERVED, VISUALLY INSPECT PIN BORE FOR EVIDENCE OF CRACKING. THE CRACKED PIN MUST BE REPLACED BEFORE NEXT FLIGHT. FORWARD PIN SHOULD HAVE SNUG FIT WITH NUT HAND-TIGHT AGAINST PIN SHOULDER.

(4) Using an adjustable extension mirror and a strong light, inspect the entire interior (bore) surface of each forward and aft trunnion pin for evidence of cracking (Ref. Fig. 601 and 602).

WARNING: ON AIRCRAFT IN WHICH A CRACKED TRUNNION PIN IS DETECTED, USE EXTREME CAUTION IN GROUND HANDLING. AVOID HEAVY BRAKING AND SHARP TURNING MANEUVERS.

EFFECTIVITY: ALL

32-11-17

Page 602
May 15/86



MAINTENANCE MANUAL

CAUTION: ON AIRCRAFT WHICH REQUIRE TRUNNION PIN REPLACEMENT, CARE MUST BE EXERCISED TO ENSURE THAT THE APPLICABLE TRUNNION PIN IS INSTALLED. FAILURE TO DO SO COULD RESULT IN PIN DAMAGE.

- R (5) If a crack is detected, remove the affected MLG trunnion pin from service and install a serviceable replacement (Ref. 32-11-01, 32-11-02).

NOTE: Gaps between the forward trunnion bushing flange and the forward trunnion lug are acceptable if the gap does not exceed 0.050 inch. Area should be filled with grease to prevent corrosion.

- R (6) If trunnion pin retainers were removed in Step 3A(2),
R reinstall as follows:

R (a) Apply MIL-C-16173, Grade 1, Corrosion Preventative
R Compound by brush to all surfaces of forward
R retainer shaft, to the mating surfaces of retainer
R nut, washers and caps, and to the associated
R mating surfaces of the forward trunnion pin.

R (b) Insert retainer shaft through bore of forward
R trunnion pin from aft end and thread cap onto
R shaft from forward end until a recess in the cap
R inner periphery aligns with hole through shaft
R located near its forward end. Insert flathead pin
R through recess and hole in shaft, install washer
R over end of flathead pin and insert cotter pin
R through hole in pin. Bend legs of cotter pin in
R opposite directions around diameter of flathead
R pin.

R (c) At aft end of forward trunnion pin, install
R retainer cap and washer over aft end of retainer
R shaft, and thread nut onto aft end of shaft.
R Position retainer assembly to assure that both
R forward and aft caps are properly seated against
R ends of trunnion pin and, restraining the shaft
R from rotating by means of a wrench at the forward
R wrenching hexagonal, torque the nut to 416±20
R foot-pounds.

R (d) Apply MIL-C-16173, Grade I Corrosion Preventative
R Compound by brush to all exposed thread surfaces
R at ends of retainer shaft to completely cover and
R seal the threads.

R (e) Apply MIL-C-16173, Grade I, Corrosion Preventative
R Compound by brush to all surfaces of aft retainer
R shaft, to the mating surfaces of nuts, washers,

EFFECTIVITY: ALL

32-11-17

Page 603
May 15/86

LOCKHEED



MAINTENANCE MANUAL

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and caps, and to the associated mating surfaces of the aft trunnion pin.

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- (f) Insert retainer shaft through bore of aft trunnion pin from forward end and install cap and washer onto shaft from aft end. Thread nut onto aft end of shaft, until at least three threads are visible, while restraining shaft from rotating by means of a wrench at the forward wrenching hexagonal.

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- (g) At forward end of aft trunnion pin, install cap and washer over forward end of retainer shaft, and thread nut onto forward end of shaft. Position retainer assembly to assure that both forward and aft caps are properly seated against ends of trunnion pin and, restraining the shaft from rotating by means of a wrench at the aft wrenching hexagonal, torque nut to 461 ± 20 foot-pounds.

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- (h) Apply MIL-C-16173, Grade I Corrosion Preventative Compound by brush to all exposed thread surfaces at both ends of retainer shaft to completely cover and seal the threads.

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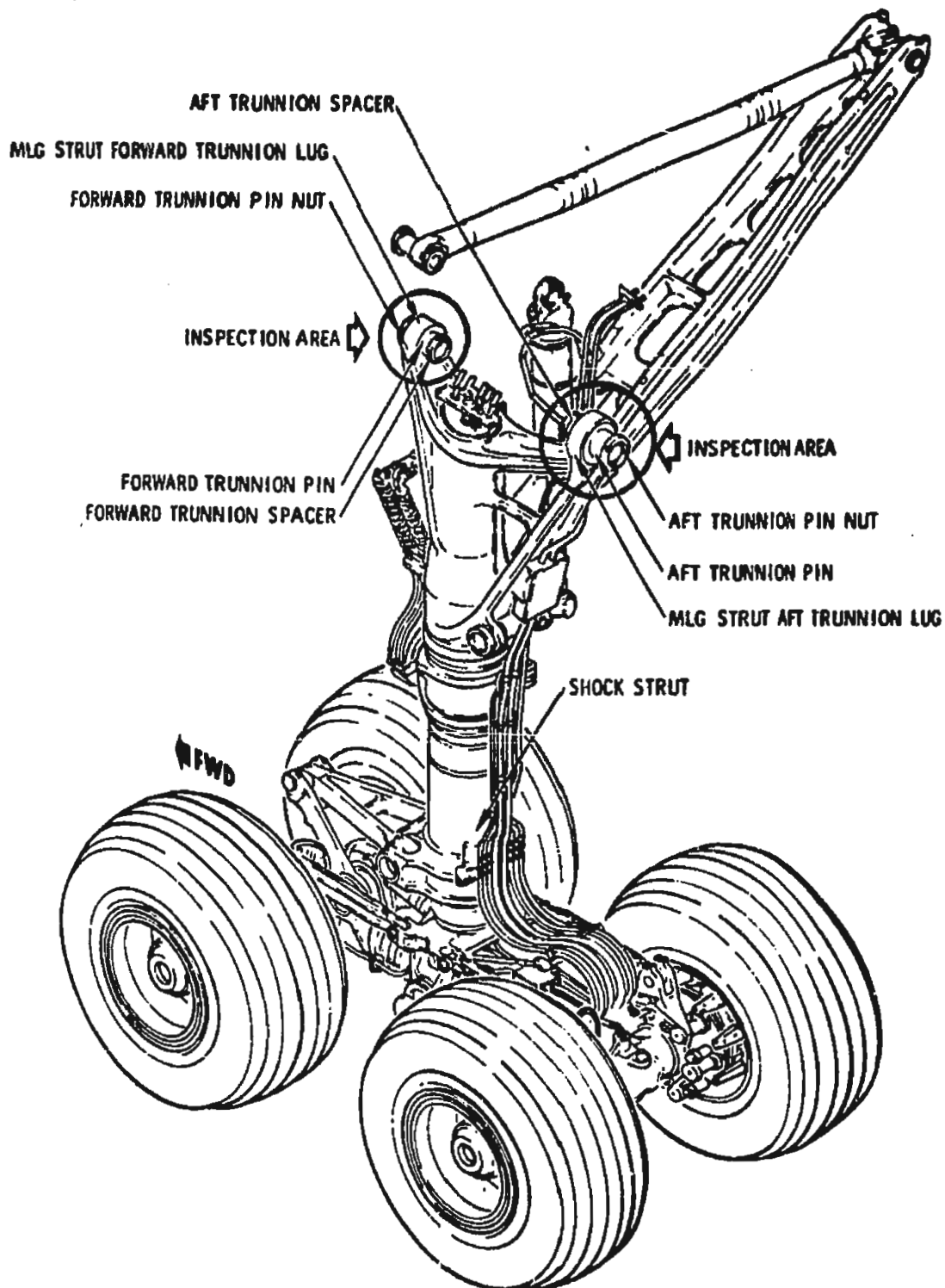
- (j) Reinstall triangular aft trunnion nut access panels and wing lower panels 541CB and 641CB.

EFFECTIVITY: ALL

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32-11-17
Page 604
May 15/86

LOCKHEED
MAINTENANCE MANUAL



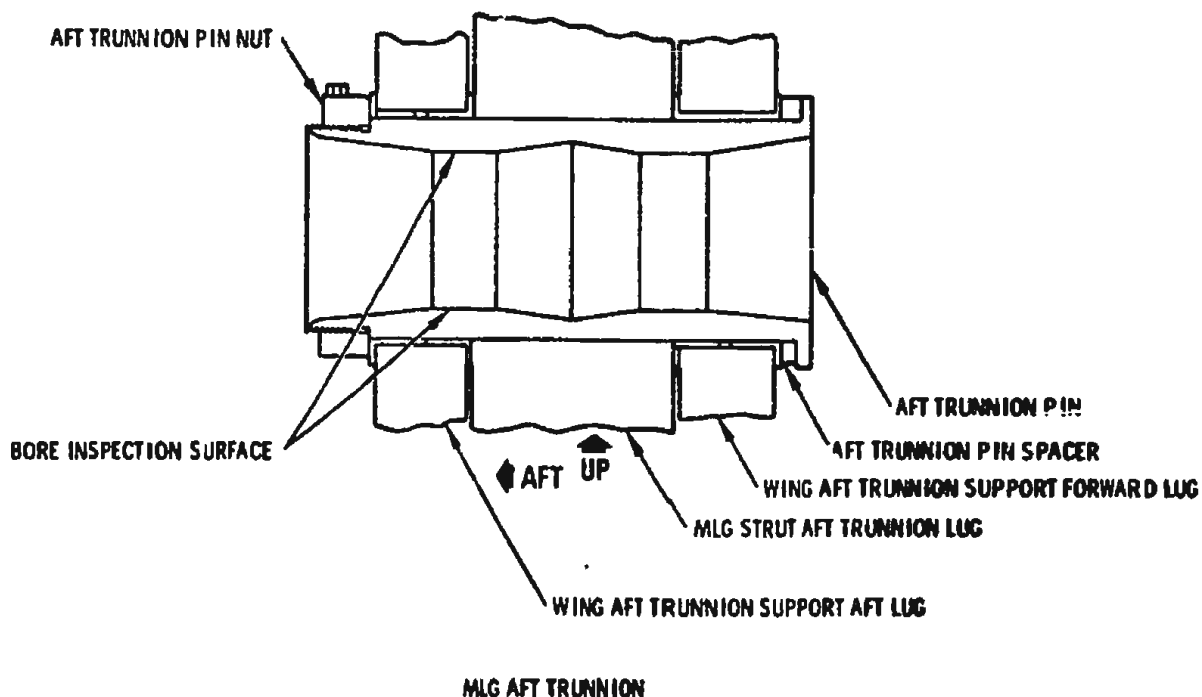
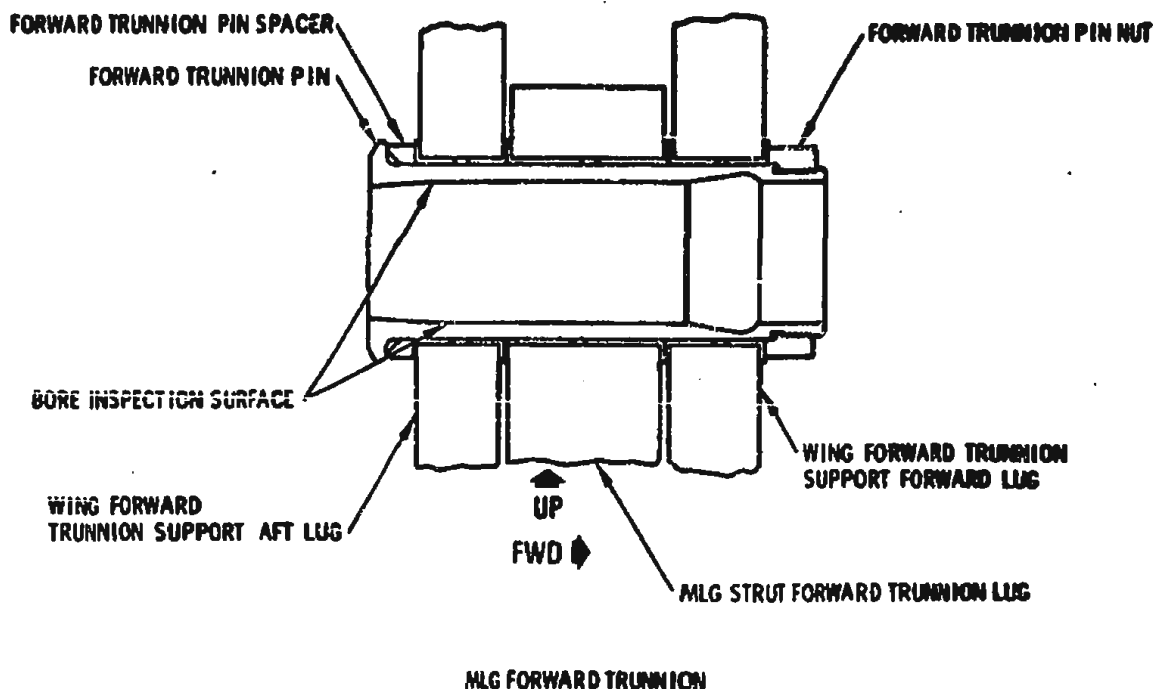
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MLG Shock Strut Trunnion Inspection Areas
Figure 601

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32-11-17
Page 605
May 15/86

LOCKHEED
MAINTENANCE MANUAL



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MLG Forward and Aft Trunnion Pin Inspection Areas
Figure 602

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001B

EFFECTIVITY: ALL

32-11-17
Page 606
May 15/86

TRUCK BEAM SHIELD - REMOVAL AND INSTALLATION1. General

R ' NOTE: This procedure is only for those truck beams which have
R the lower half of the truck beam protected by a truck
R beam shield (Ref. SB32-041).

The shield is secured to the truck beam with a bolt at each end and six clamps, three forward and three aft, which encircle the truck beam. Four of the clamps, three forward and the one aft which is closest to the truck beam mid point, also support hydraulic lines and electrical conduit. Prior to removing the truck beam shield clamps, the position of the clamps must be marked on the truck beam with a non abrasive marker and the location of each clamp must be marked on the clamp.

2. Equipment and Materials

Tape, LT100A-Type 1, 250 inches, or equivalent

3. Removal/Installation

A. Removal

- (1) Remove nuts and washers securing hydraulic line and conduit clamps to truck beam shield clamps. Remove hydraulic line and conduit clamps from truck beam shield clamp clip studs.
- (2) Mark clamps and truck beam for location and remove nut and washer from each truck beam shield clamp T-bolt (Ref. Fig. 401).
- (3) Remove truck beam shield clamps from truck beam and shield. Remove tape.
- (4) Support shield and remove bolts and washers securing shield to truck beam at forward and aft ends.
- (5) Remove shield.

B. Installation

- (1) Position truck beam shield on under side of truck beam.
- (2) Install washers and bolts at forward and aft ends of truck.

EFFECTIVITY: ALL

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32-11-19
Page 401
May 15/85



MAINTENANCE MANUAL

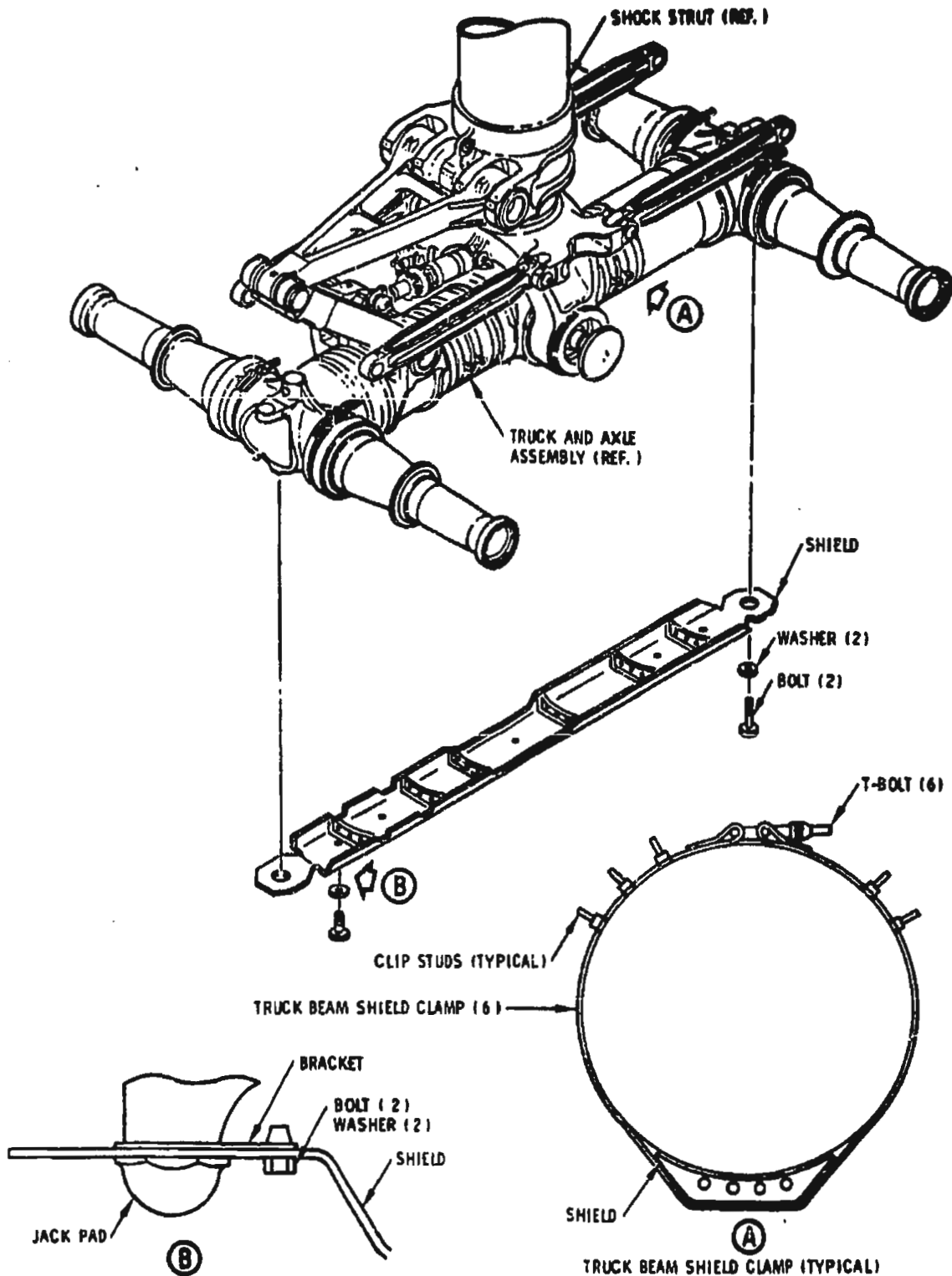
- (3) Apply new tape around truck beam and shield at clamp locations.
- (4) Position truck beam shield clamps in locations marked during removal.
- (5) Install washers and nuts on clamp T-bolts. Do not tighten clamps so that clip studs cannot be positioned for hydraulic line and conduit clamp installation.
- (6) Install hydraulic line and conduit clamps on truck beam shield clamp clip studs. It may be necessary to move clip studs to install clamps. Secure clamps to clip studs with washers and nuts.
- (7) Tighten truck beam shield T-bolt nuts making certain that hydraulic lines and conduits are correctly positioned.
- (8) Inspect hydraulic lines and conduits to ensure that no strain is placed on lines, conduits or clamps.

EFFECTIVITY: ALL

001B

32-11-19
Page 402
May 15/85

LOCKHEED
MAINTENANCE MANUAL



M1-29102-32-160

Truck Beam Shield - Removal and Installation
Figure 401

EFFECTIVITY: ALL

001B

32-11-19
Page 403/404
May 15/85

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR DOWNLOCK SPRINGS - REMOVAL AND INSTALLATION

1. Equipment and Materials

- R Grease, Ref. MM12-20-00, Lubrication, Scheduled Servicing
Cotter pin, MS24665-153, or equivalent
Downlock Spring Tool Assembly, Dwg No. B698, or equivalent

2. Referenced Procedure

32-33-00 Main Landing Gear Inboard Door - Maintenance Practices

3. Removal/Installation

A. Removal

- (1) Ensure that main landing gear (MLG) and nose landing gear (NLG) downlock safety pins are installed.
- (2) Open MLG inboard door (Ref. 32-33-00).

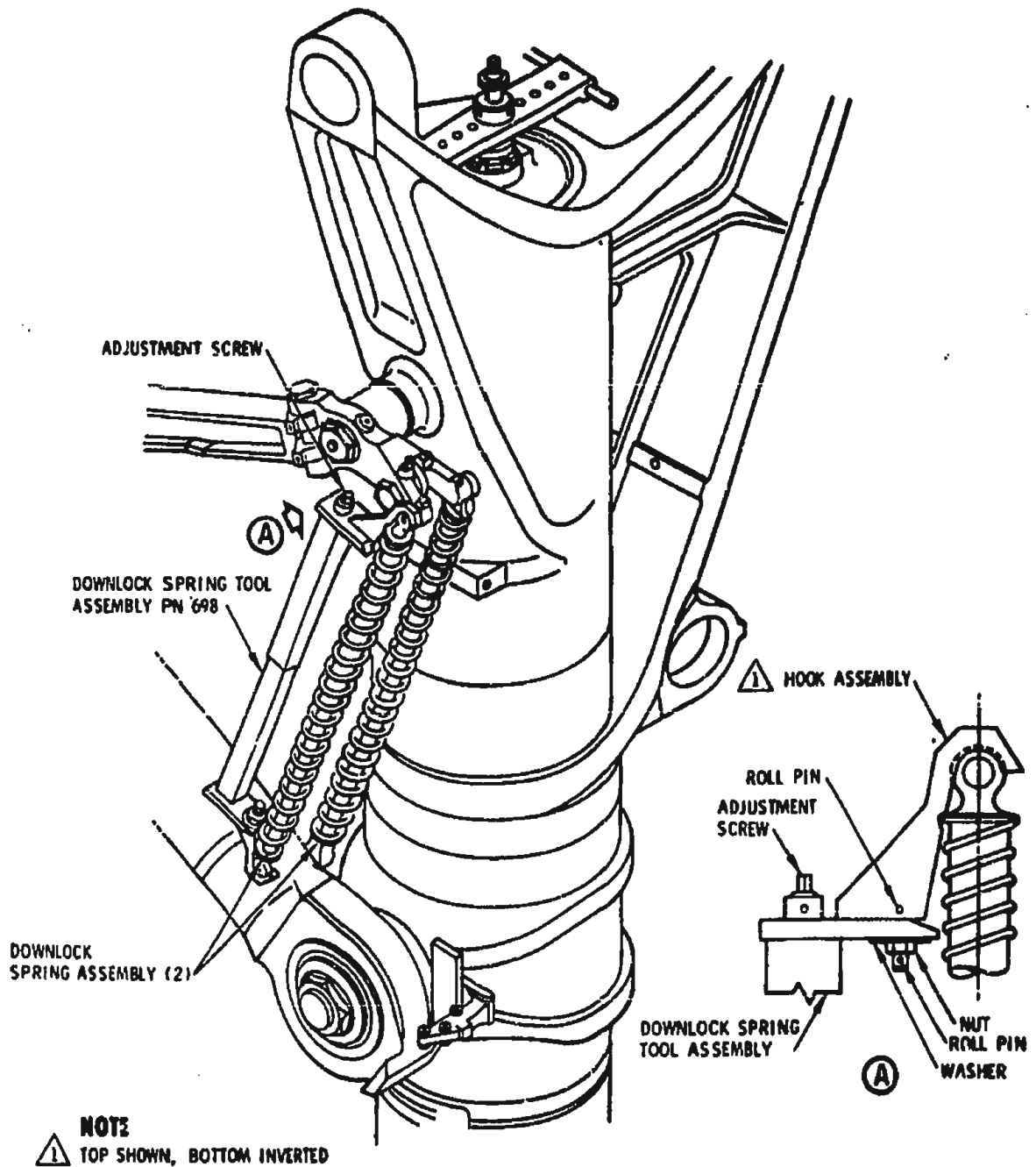
WARNING: DOWNLOCK SPRING EXERTS A FORCE OF 300 POUNDS. FAILURE TO RESTRAIN SPRING DURING REMOVAL CAN RESULT IN SERIOUS INJURY TO PERSONNEL AND DAMAGE TO AIRCRAFT OR EQUIPMENT.

- (3) Assemble downlock spring tool assembly and install on spring to be removed (Ref. Fig. 401).
- (4) Adjust tool assembly to restrain spring and prevent explosive disassembly, when attaching parts are removed. Adjust tool assembly to unload spring attach pin from spring pressure.
- (5) At upper end of downlock spring, remove upper pin securing downlock spring to jury brace (Ref. Fig. 402).
- (6) At lower end of downlock spring, remove retaining bolt, and then remove collar.
- (7) Remove downlock spring assembly and tool assembly as a unit.
- (8) Unwind tool assembly until downlock spring is extended to free length; remove tool.

EFFECTIVITY: ALL

32-11-20
Page 401
May 15/85

LOCKHEED
MAINTENANCE MANUAL



M1-0102-32-100

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Downlock Spring Tool Assembly
Figure 401

EFFECTIVITY: ALL

0018

32-11-20
Page 402
May 15/76



- (9) Remove spring from spring guide cylinder and spring guide piston.

B. Installation

CAUTION: CARE MUST BE TAKEN TO INSURE NO GREASE IS APPLIED ON DOWNLOCK SPRINGS, PISTON GUIDES OR NYLON BUSHINGS.

- (1) Coat outside diameter of downlock spring pin, and actuator pin with grease.
- (2) Install spring on spring guide cylinder and spring guide piston.
- (3) Install lower end of downlock spring assembly on lower pin.
- (4) Install collar on pin and secure in place with bolt, washer, and nut. Safety nut with cotter pin.

R CAUTION: CARE MUST BE EXERCISED TO PREVENT GREASE FROM BEING APPLIED TO DOWNLOCK SPRINGS, AND SPRING GUIDE CYLINDERS AND PISTONS.

- (5) Coat upper pin with grease.

R WARNING: WHEN COMPRESSED TO INSTALLED LENGTH, EACH DOWNLOCK SPRING EXERTS A FORCE OF APPROXIMATELY 150 POUNDS. EXERCISE EXTREME CARE DURING INSTALLATION TO PREVENT SPRING RELEASING FROM TOOL ASSEMBLY.

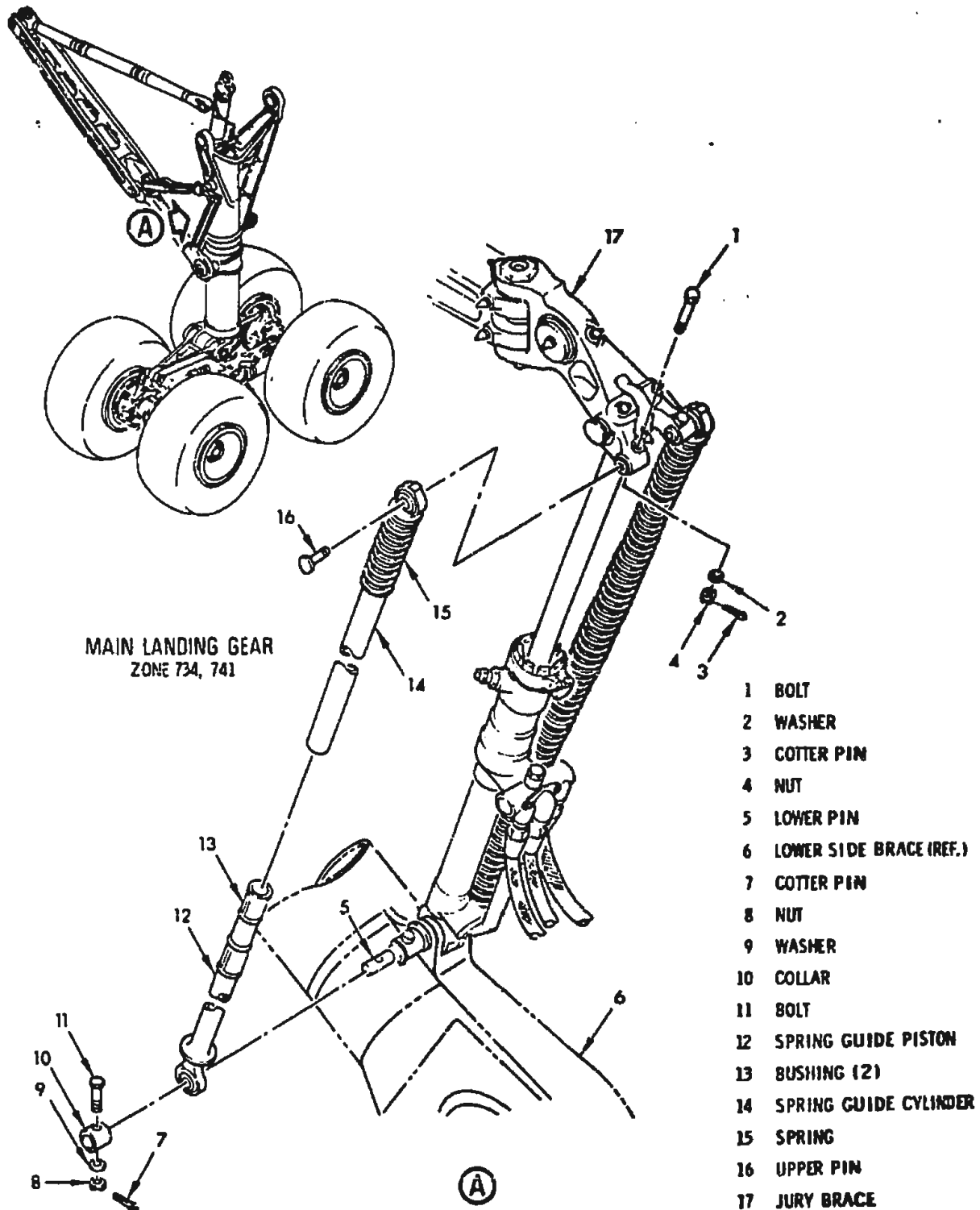
- (6) Using downlock spring tool assembly, compress downlock spring assembly until upper pin can be inserted through spring-end fitting into jury brace.
- (7) Secure pin with bolt, washer, and nut. Safety nut with cotter pin.
- (8) Remove tool assembly.

EFFECTIVITY: ALL

001B

32-11-20
Page 403
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



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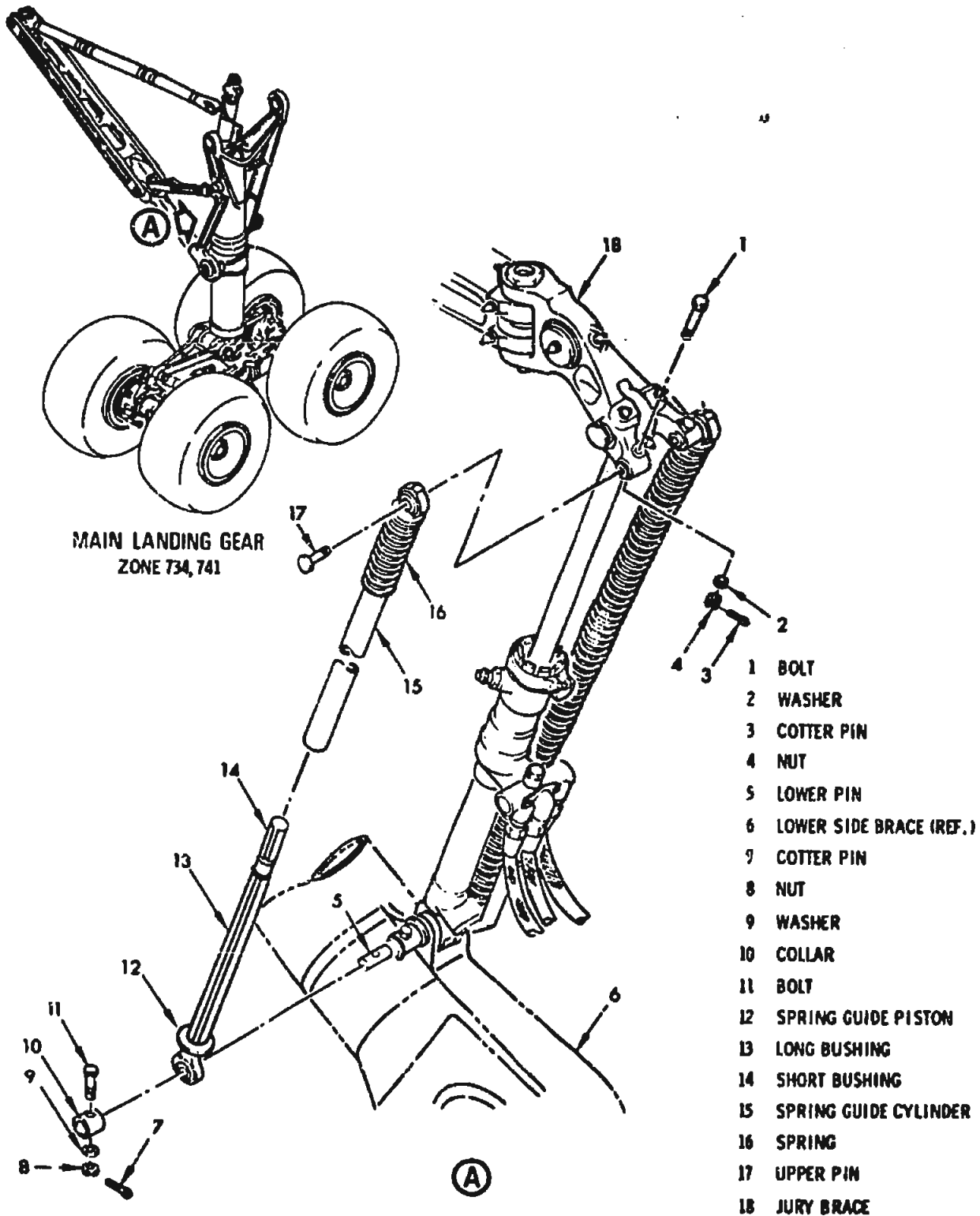
R Main Landing Gear Downlock Springs - Removal and Installation
R Figure 402

EFFECTIVITY: 001-008

32-11-20
Page 404
Nov 15/77

001B

LOCKHEED
MAINTENANCE MANUAL



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Main Landing Gear Downlock Springs - Removal and Installation
Figure 402

EFFECTIVITY: 009-999

32-11-20
Page 405/406
Nov 15/77

0018

LOCKHEED
MAINTENANCE MANUAL

R MAIN LANDING GEAR HYDRAULIC HOSE ASSEMBLIES
R REMOVAL AND INSTALLATION

R 1. General

R This procedure contains instructions for removal and
R installation of the hydraulic brake pressure and truck
R positioner hoses between the strut and truck tubing. Included
R are alignment instructions for positioning the clamp block
R assemblies.

R 2. Referenced Procedures

R 24-00-00 External Power - Maintenance Practices
R 29-11-00 Hydraulic Power System - Maintenance Practices
R 32-43-00 Main Landing Gear Brake System - Maintenance
R Practices

R 3. Removal/Installation

R A. Removal

- R (1) Turn on electrical power (Ref. 24-00-00).
R (2) Turn off hydraulic systems B and C pressure and
R depressurize hydraulic system accumulators (Ref.
R 29-11-00).
R (3) On Flight Engineer/Second Officers circuit breaker
R panel CB2, zone 215, ensure that circuit breakers
R PARKING BRAKE NO. 1 (G18), PARKING BRAKE NO. 2 (G22),
R and BRAKE PRES IND (G21) are closed.
R (4) On pilots center instrument panel, zone 210, place
R BRAKE SYS SELECT switch in NORM SYS B position.
R (5) Pump brake pedals until normal brake system pressure is
R 0 psi.
R (6) Place BRAKE SYS SELECT switch in ALT SYS C position.
R (7) Pump brake pedals until alternate brake system pressure
R is 0 psi.

R WARNING: ENSURE THAT NORMAL AND ALTERNATE BRAKE SYSTEM
R PRESSURES ARE 0 PSI.

R EFFECTIVITY: ALL
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001B

32-11-26
Page 401
Aug 15/77



- (8) Turn off electrical power (Ref. 24-00-00).
- (9) As applicable, slowly open bleed valves on brakes and truck positioner to bleed off any residual pressure.
- (10) At support bracket (strut), disconnect hose assemblies as required (Ref. Fig. 401). Do not loosen nuts securing hydraulic lines to bracket.
- (11) At support bracket (truck), disconnect applicable hose assemblies.
- (12) At clamp block assemblies remove clamp blocks as required to free hoses.
- (13) Remove hoses.

B. Installation

- (1) Connect hoses to strut and truck support bracket hydraulic lines (Ref. Fig. 401).
- (2) Place hoses in depressions of clamp block assemblies and install clamp blocks.

R CAUTION: CLAMP BLOCK ASSEMBLIES MUST BE CORRECTLY ALIGNED IN ORDER TO RETAIN THE HOSES IN CORRECT POSITIONS. HOSES INCORRECTLY POSITIONED MAY STRIKE AIRCRAFT STRUCTURE DURING RETRACTION AND EXTENSION RESULTING IN HOSE DAMAGE.

- (3) Ensure that hose clamp blocks are correctly positioned along hoses (Ref. Fig. 401, View G). Tighten all screws.
- (4) Ensure that brake and truck positioner bleed valves are closed and secured.
- (5) Turn on electrical power (Ref. 24-00-00).



MAINTENANCE MANUAL

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WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

LANDING GEAR CONTROL LEVER IS IN THE DOWN POSITION.

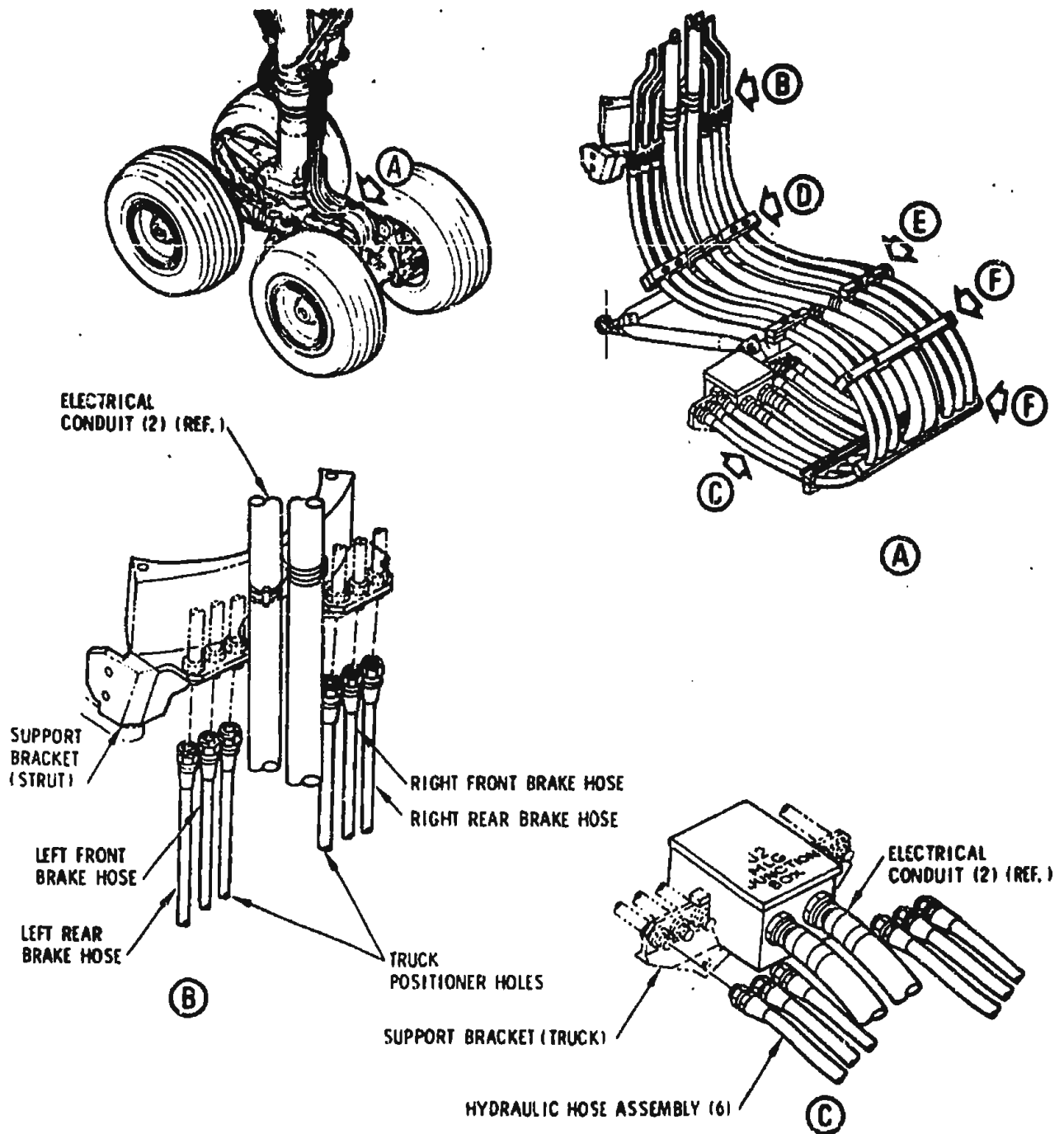
- (6) Turn on hydraulic system B and C pressures (Ref. 29-11-00).
- (7) As required, bleed applicable brakes (Ref. 32-43-00) and truck positioner at bleed valve.
- (8) Apply brakes and inspect hoses and connectors for leaks.
- (9) Turn off hydraulic pressure (Ref. 29-11-00).
- (10) Turn off electrical power (Ref. 24-00-00).

EFFECTIVITY: ALL

001B

32-11-26
Page 403
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



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Main Landing Gear Hydraulic Hose Assemblies
Removal and Installation
Figure 401 (Sheet 1)

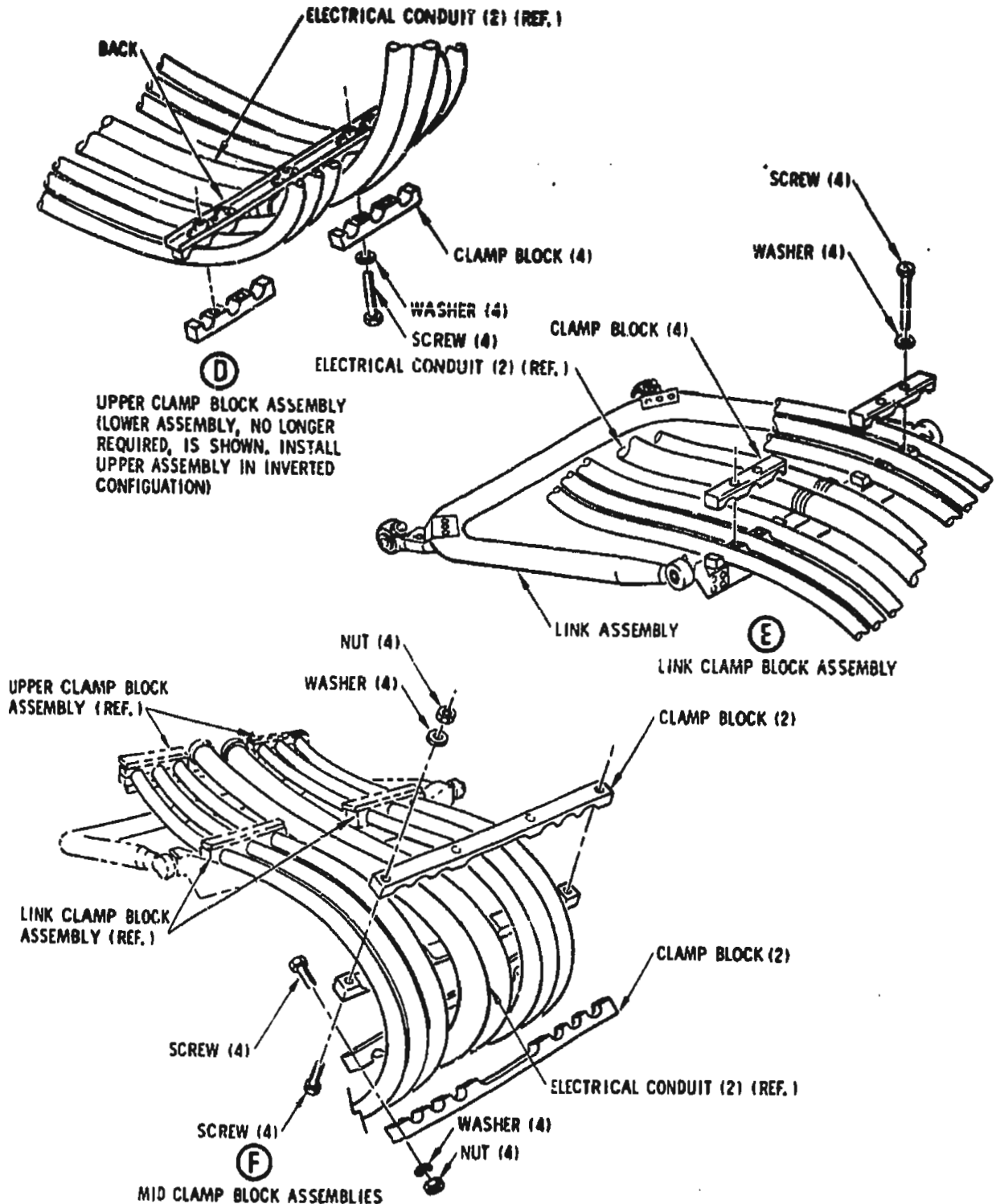
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EFFECTIVITY: ALL

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32-11-26
Page 404
Jul 15/84

LOCKHEED
MAINTENANCE MANUAL



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Main Landing Gear Hydraulic Hose Assemblies
Removal and Installation
Figure 401 (Sheet 2)

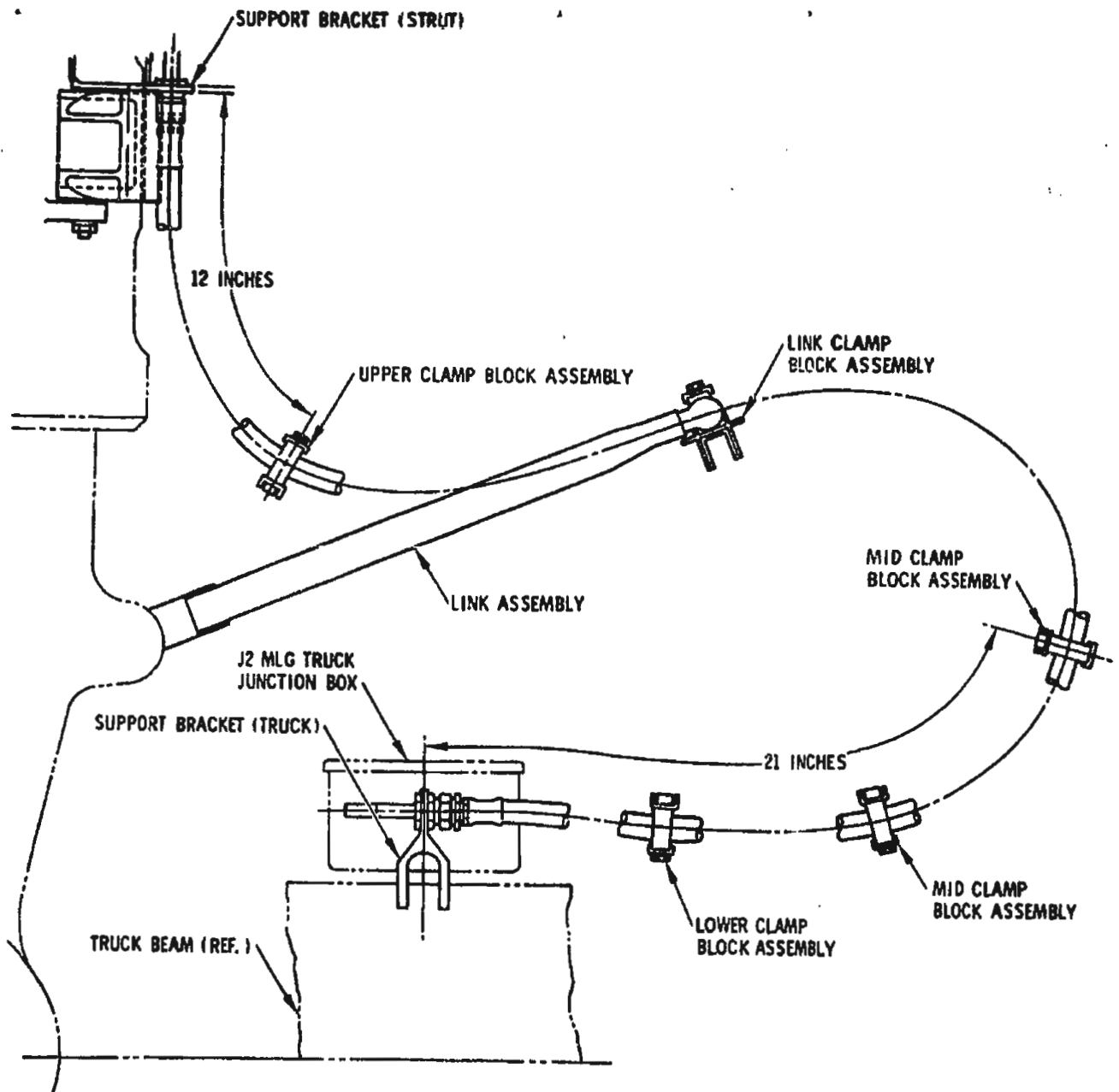
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32-11-26
Page 405
Jul 15/83

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LOCKHEED
MAINTENANCE MANUAL



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Main Landing Gear Hydraulic Hose Assemblies
Removal and Installation
Figure 401 (Sheet 3)

EFFECTIVITY: ALL

32-11-26
Page 406
Nov 15/88

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MAIN LANDING GEAR RETRACTION ACTUATOR ATTACH PIN ASSEMBLY
REMOVAL AND INSTALLATION

1. Equipment and Materials

CR Main Landing Gear Actuator Pin Replacement Tool Set, Dwg No. B966NC, or equivalent (optional)

Cotter Pin MS24665-153, or equivalent

Cotter Pin MS24665-300, or equivalent

Grease, Ref. MM12-20-00, Lubrication, Scheduled Servicing

2. Referenced Procedures

10-10-00 Parking - Maintenance Practices

12-24-01 Main Landing Gear - Servicing

29-11-00 Hydraulic Power System - Maintenance Practices

R 32-11-02 Main Landing Gear Assembly - Overhaul Manual with Illustrated Parts List

32-33-00 Main Landing Gear Inboard Door - Maintenance Practices

3. Removal/Installation

A. Removal

- (1) Install landing gear downlock safety pins (Ref. 10-10-00).
- (2) Open applicable MLG door and install MLG inboard door actuator lock (Ref. 32-33-00).
- (3) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag AC PUMP C3 (L22) circuit breaker.
- (4) Install Maintenance-in-Progress tags on landing gear control handle.
- (5) Remove electrical conduit restraining clamps from pin assembly.

EFFECTIVITY: ALL

001B

32-11-27
Page 401
Nov 15/86



MAINTENANCE MANUAL

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- (6) Remove cotter pin and nut from actuator lower pin thru-bolt and remove bolt (Ref. Fig. 401).
 - (7) Remove both endcaps.
 - (8) Remove actuator lower pin. Use MLG actuator pin replacement tool if required.
 - (9) Remove MLG fixed door (Ref. 32-12-02).
 - (10) Remove cotter pin, nut, washer, lockbolt and actuator attach pin nut from actuator attach pin.
 - (11) Remove actuator attach pin and spacer from lugs on shock strut.

B. Installation

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- (1) Slide spacer on actuator attach pin and coat bearing surface of pin with grease (Ref. Fig. 401).
 - (2) Insert actuator attach pin through lugs on cylinder of shock strut so clevis end is at the inboard side of the landing gear assembly and grease fittings are pointing downward.
 - (3) Coat bearing face of actuator attach pin nut with grease and install nut. Tighten nut as required to assure pin and spacer are tightly seated against strut inboard lug bushing face.
 - (4) Back off actuator attach pin nut as necessary to obtain 0.03 to 0.04 clearance between the nut and the strut outboard lug bushing flange and alignment for installation of actuator pin lockbolt. Install lockbolt, washer, nut and cotter pin. Install lockbolt with head inside pin. If necessary elongate lock hole in the nut to permit installation of the lockbolt.
 - (5) Install actuator lower pin. MLG actuator pin replacement tool may be used as required.
 - (6) Install pin endcaps, thru-bolt, nut and cotter pin.
 - (7) Install electrical conduit restraining clamps on pin assembly.
 - (8) Lubricate all fittings affected by this procedure (Ref. 12-24-01).
 - (9) Remove tags installed in Step 3A(4) and close circuit breakers opened in Step 3A(3).
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EFFECTIVITY: ALL

32-11-27
Page 402
Dec 15/95

LOCKHEED



MAINTENANCE MANUAL

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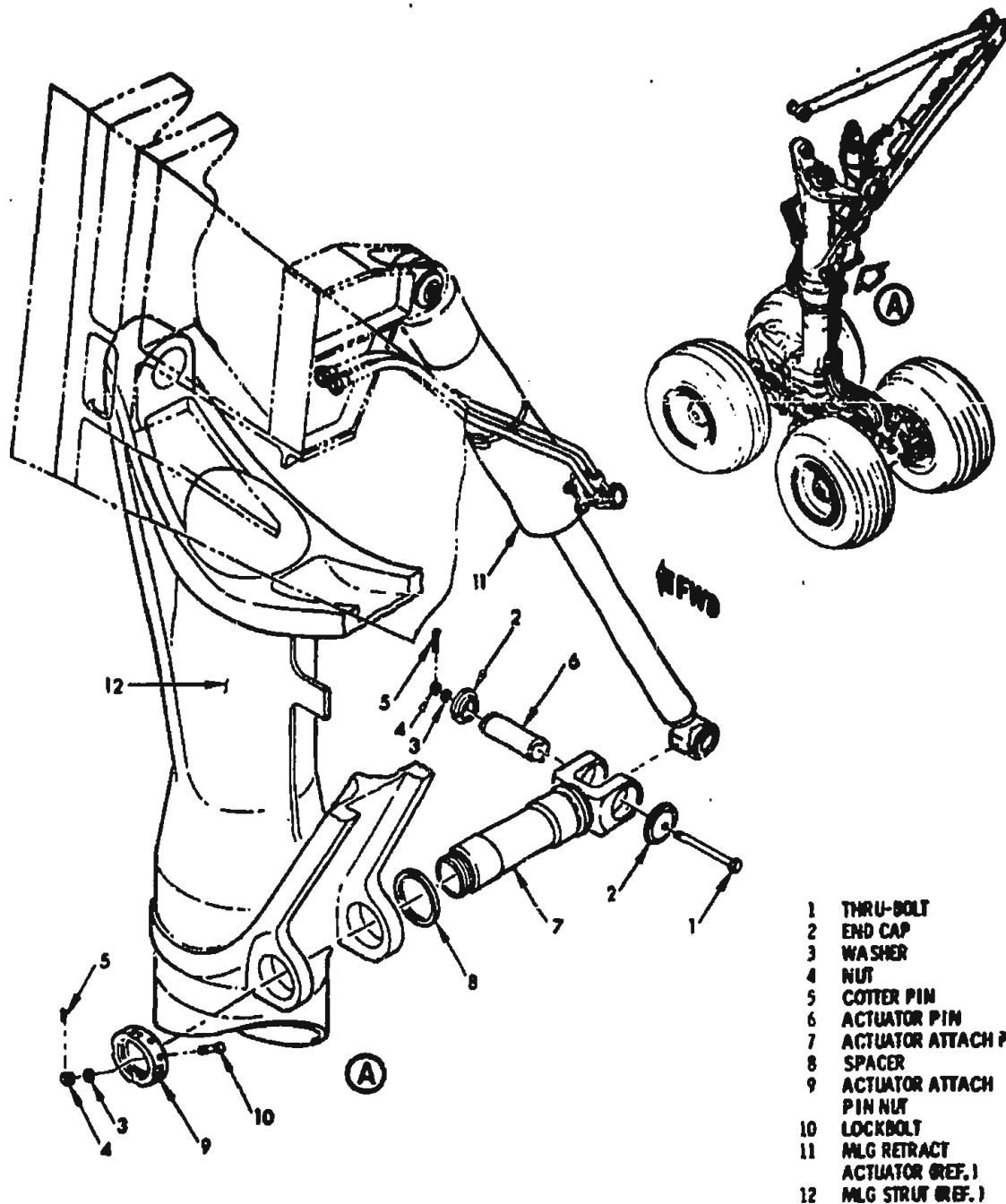
- (10) Remove MLG door actuator lock and close MLG inboard door (Ref. 32-33-00).

EFFECTIVITY: ALL

001B

32-11-27
Page 403
Nov 15/86

LOCKHEED
MAINTENANCE MANUAL



NOTE
FIXED MLG STRUT DOOR AND ELECTRICAL CONDUIT
RESTRAINING CLAMPS NOT SHOWN FOR CLARITY

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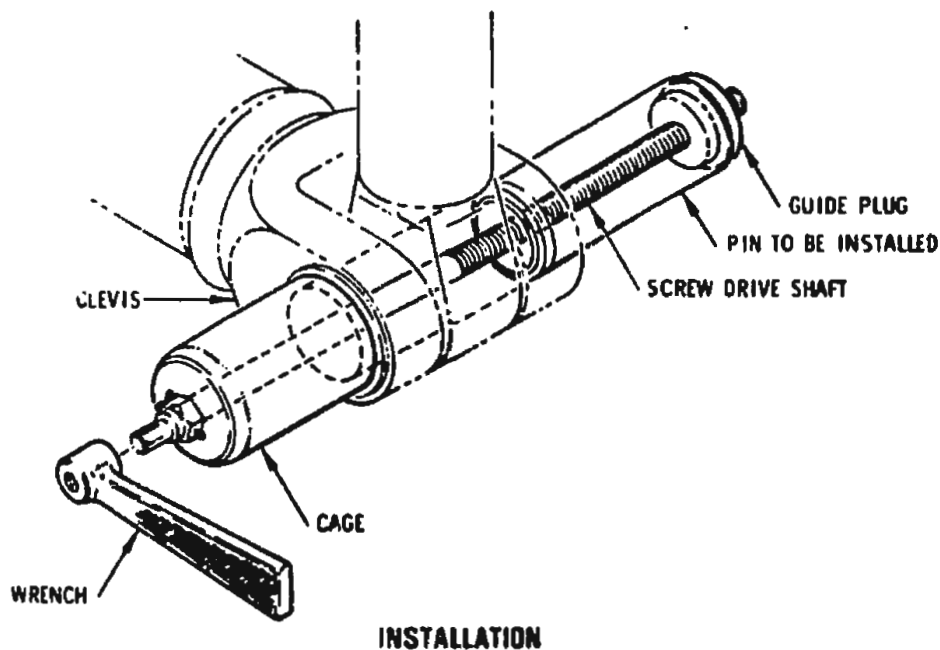
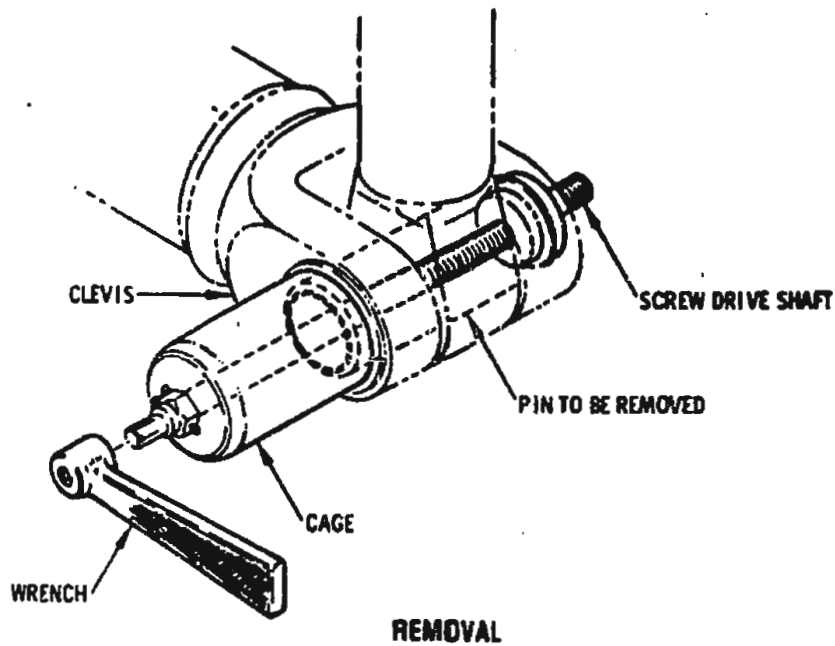
Main Landing Gear Retraction Actuator Attach Pin
Removal and Installation
Figure 401 (Sheet 1)

EFFECTIVITY: ALL

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32-11-27
Page 404
Jun 15/80

LOCKHEED
MAINTENANCE MANUAL



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R Main Landing Gear Retraction Actuator Attach Pin - Removal and
R Installation
R Figure 401 (Sheet 2)

R EFFECTIVITY: ALL
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001B

32-11-27
Page 405/406
Sep 15/79

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR INBOARD DOOR ASSEMBLY
REMOVAL AND INSTALLATION

1. Equipment and Materials

Torque Wrench (100 lb. in. capacity)

R Grease, Ref. MM12-20-00, Lubrication, Scheduled Servicing

2. Referenced Procedures

- | | |
|----------|---|
| 10-10-00 | Parking - Maintenance Practices |
| 29-11-00 | Hydraulic Power System - Maintenance Practices |
| 32-12-01 | Main Landing Gear Door - Adjustment and Test |
| 32-30-00 | Landing Gear Retraction and Extension - Adjustment and Test |
| 32-33-00 | Main Landing Gear Inboard Door - Maintenance Practices |

3. Removal/Installation

A. Removal

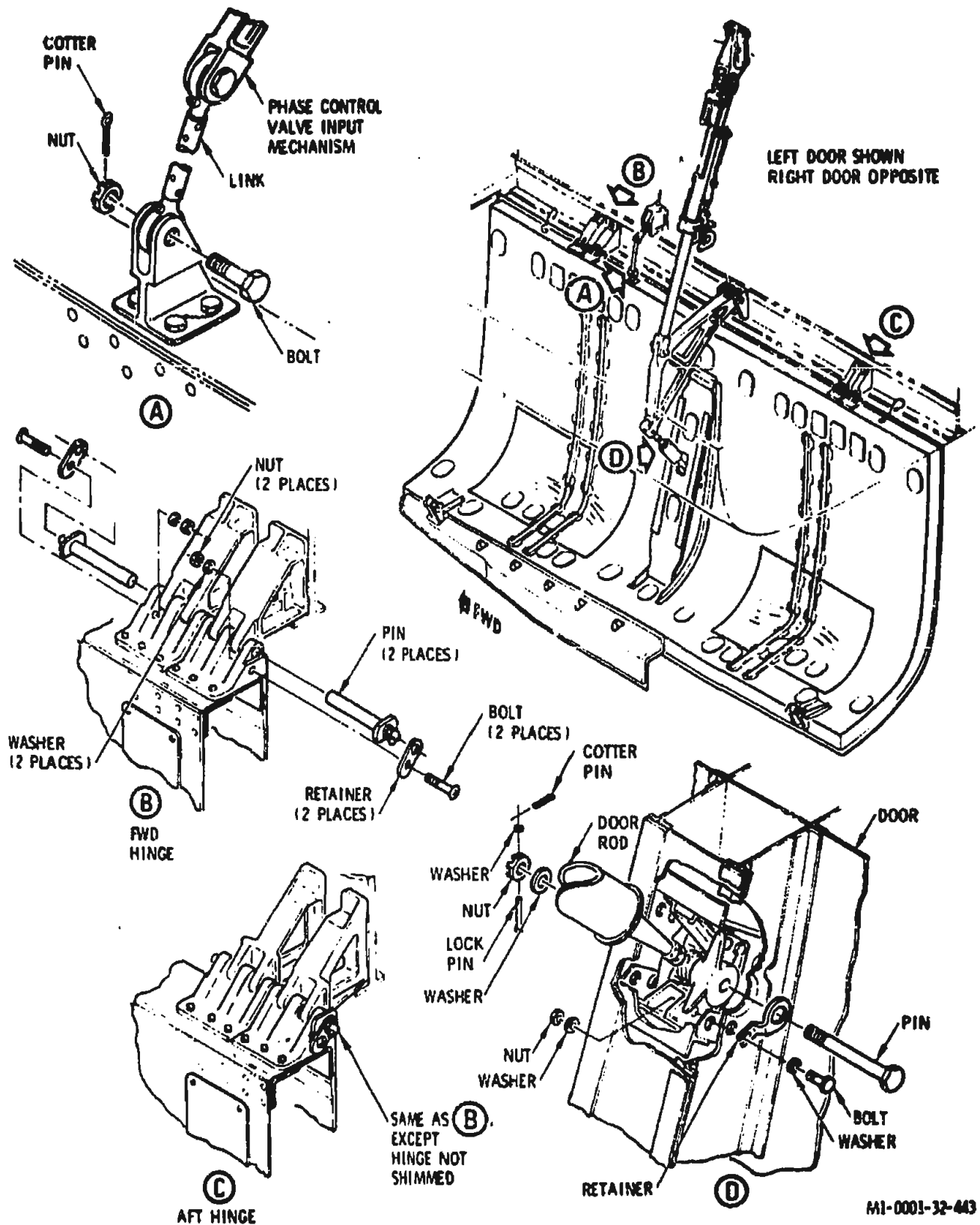
- (1) Install left and right MLG and NLG downlock safety pins (Ref. 10-10-00).
- (2) Pull applicable D-handle to open MLG door and install MLG inboard door actuator lock (Ref. 32-33-00).
- (3) Disconnect phase control valve input mechanism linkage (Ref. Fig. 401).
- (4) Ensure that hydraulic system C pressure is 0 psi (Ref. 29-11-00).
- (5) Disconnect two electrical bonding jumpers at door.
- (6) Disconnect door actuation rod at door.
- (7) Support door sufficiently to remove load from hinge points.
- (8) At each hinge (two forward and two aft) remove hinge pin retainers.

EFFECTIVITY: ALL

001B

32-12-01
Page 401
May 15/85

LOCKHEED
MAINTENANCE MANUAL

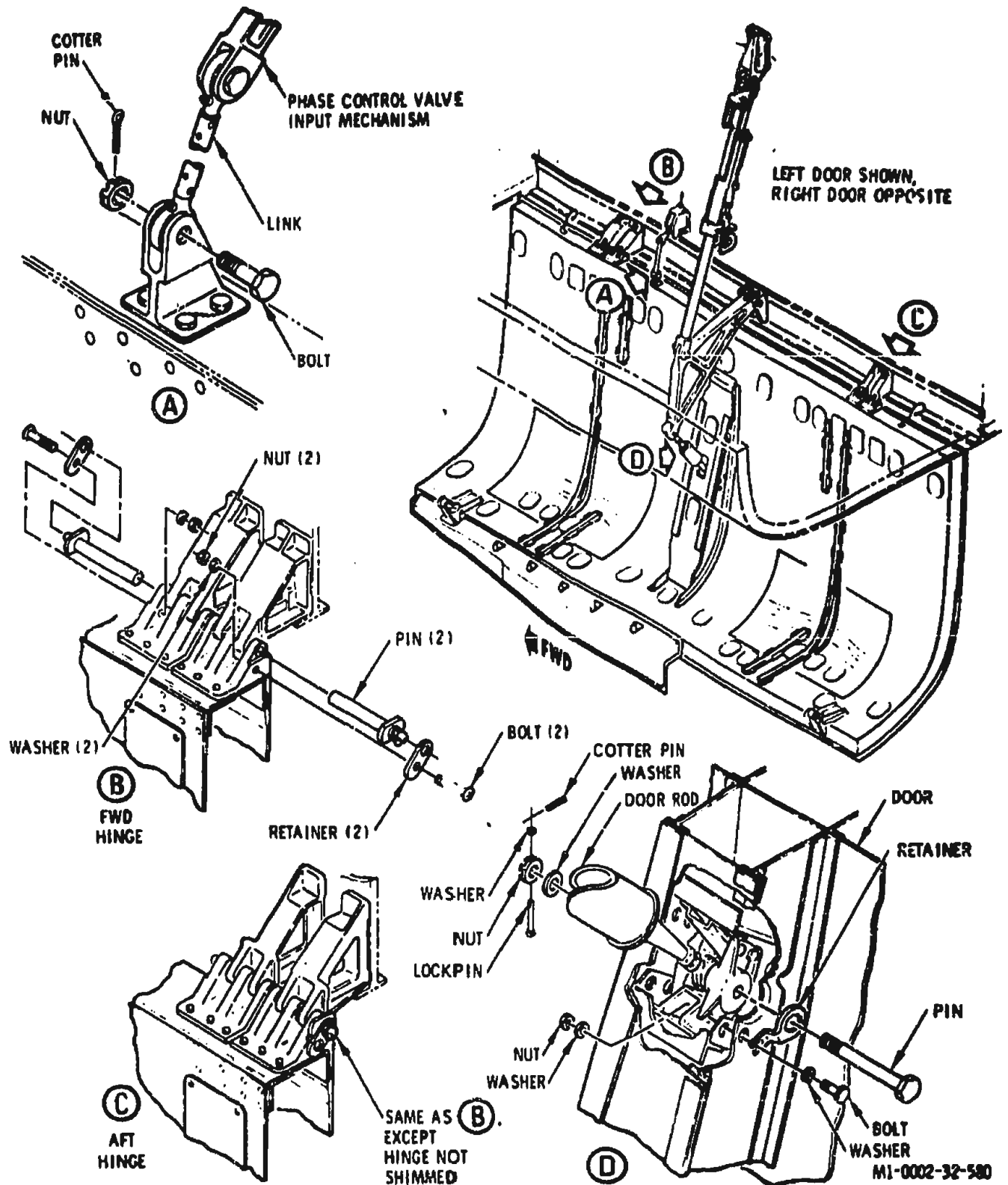


Main Landing Gear Inboard Door - Removal and Installation
Figure 401

EFFECTIVITY: 001-031 WITHOUT SB52-085

32-12-01
Page 402
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



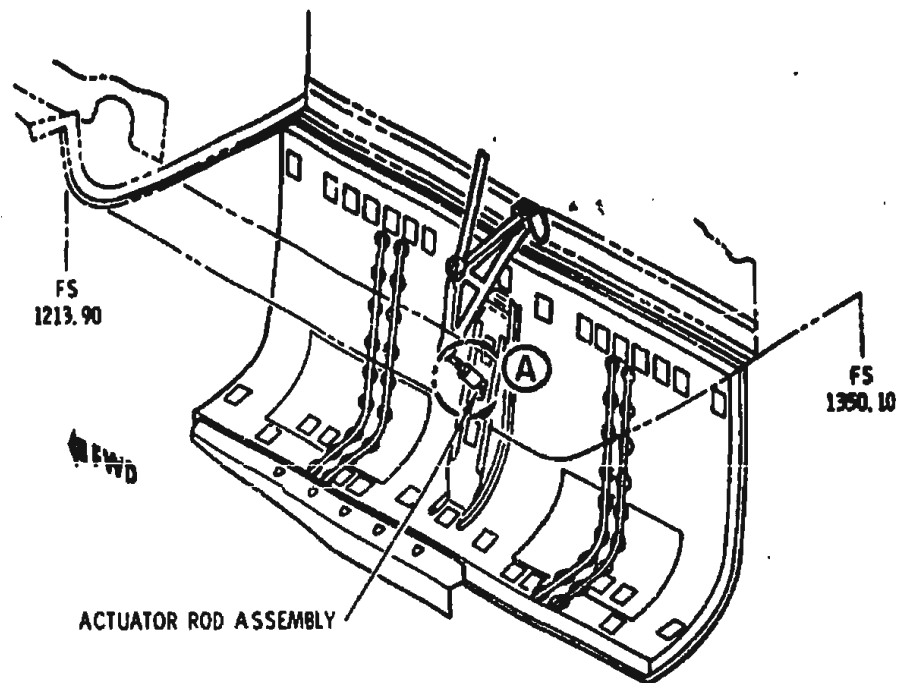
Main Landing Gear Inboard Door - Removal and Installation
Figure 401

EFFECTIVITY: 001-031 WITH SB52-085 AND 032-999

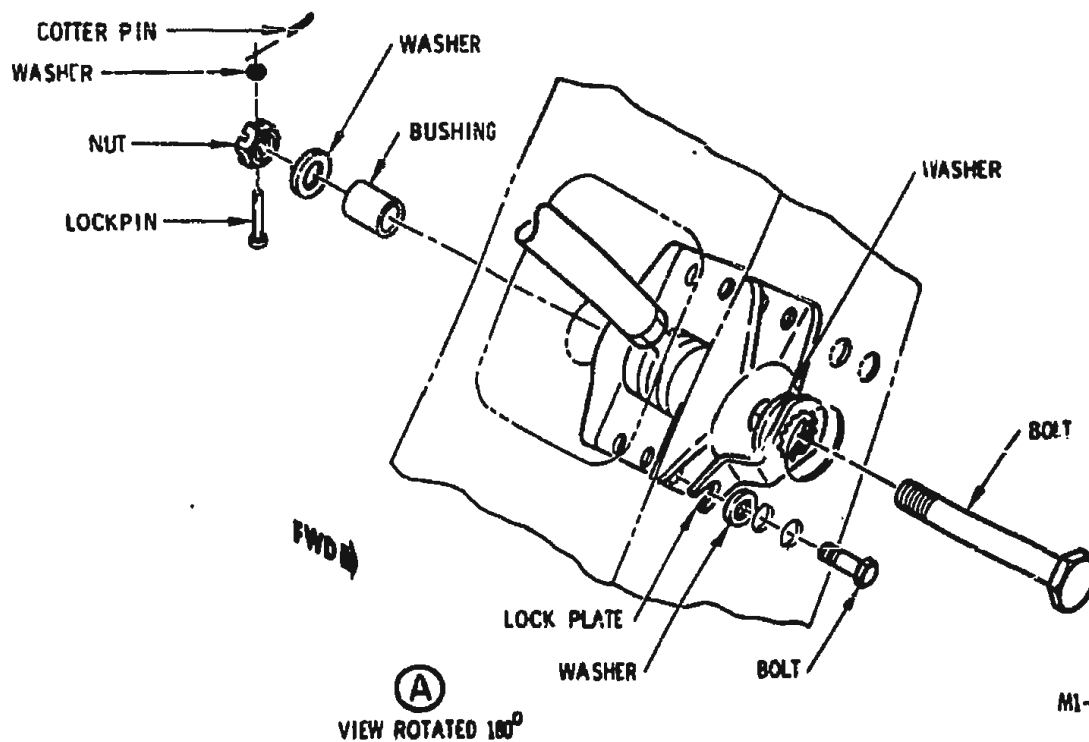
32-12-01
Page 403
Nov 15/88

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LOCKHEED
MAINTENANCE MANUAL



LEFT MLG DOOR SHOWN, RIGHT MLG DOOR OPPOSITE



R
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MLG Door Inboard Actuator Link - Removal and Installation
Figure 402

EFFECTIVITY: ALL

32-12-01
Page 404
Sep 15/79

001B

LOCKHEED
MAINTENANCE MANUAL

- (9) Remove hinge pins from hinges.
- (10) Remove door.

B. Installation

- (1) At forward fitting of forward hinge (both structure hinge-half and door hinge-half), ensure that flanged bushings are installed as follows (Ref. Fig. 403):
 - (a) One on each lug of structure hinge-half with flanges facing inward.
 - (b) Two on center lug of door hinge-half with flanges facing outward.
- (2) Ensure that hydraulic system C pressure is at 0 psi.
- (3) Place door on hoisting equipment, position door, and engage hinges.
- (4) Join hinge halves so that alignment permits installation of hinge pins.
- (5) Coat hinge pins with grease.
- (6) Install both hinge pins in aft hinge.
- (7) At forward hinge, install aft pin.
- (8) Position door so that, at forward fitting of forward hinge, gap is equal on both sides of door hinge-half center lug (Ref. Fig. 403).
- (9) Using feeler gage determine gap dimensions on both sides.
 - (a) If gap dimensions are greater than 0.032 inch, use one washer on each side of forward door hinge-half center lug.

NOTE: Additional shimming to fill remaining gap is NOT required.

- (b) If gap dimensions are less than 0.032 inch, peel two shim washers equally to match these dimensions. Install shim washers, one on each side of center lug. Fit should be snug but not binding.

NOTE: Shim washers are 0.032 inch thick and are peelable in 0.002-inch increments.

EFFECTIVITY: ALL

32-12-01
Page 405
Mar 15/91

001B

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LOCKHEED



MAINTENANCE MANUAL

- (10) Install forward hinge forward pin.
- (11) Install retainers on all hinge pins. Secure each retainer with bolt, washer, and nut.
- (12) Connect electrical bonding jumpers to door.
- (13) On aircraft 001-031 without SB52-123, connect door actuation rod at door.
- (13) On aircraft 001-031 with SB52-123 and 032-999, reassemble door actuation rod at door using the following steps (Ref. Fig. 402).
 - (a) Omit washer under head of bolt for initial installation.
 - (b) Install nut and washer on to bolt and torque nut to 60 to 90 in. lb., but do not lock.
 - (c) Grasp rod end and move vigorously fore and aft to ensure elimination of all side play.
 - (d) If side play exists, remove nut, bolt and reinstall with washer (1 max) under bolt head.
 - (e) Torque nut 60-90 lb. in. Install lock pin and cotter pin through nut and retainer on bolt head. Secure retainer with bolt and washer.
- (14) Connect phase control valve input mechanism linkage to door.
- (15) Remove MLG inboard door actuator lock.
- (16) Perform MLG inboard door - adjustment and test (Ref. 32-12-01).
- (17) If new door is installed check MLG door input to phase control valve rigging.

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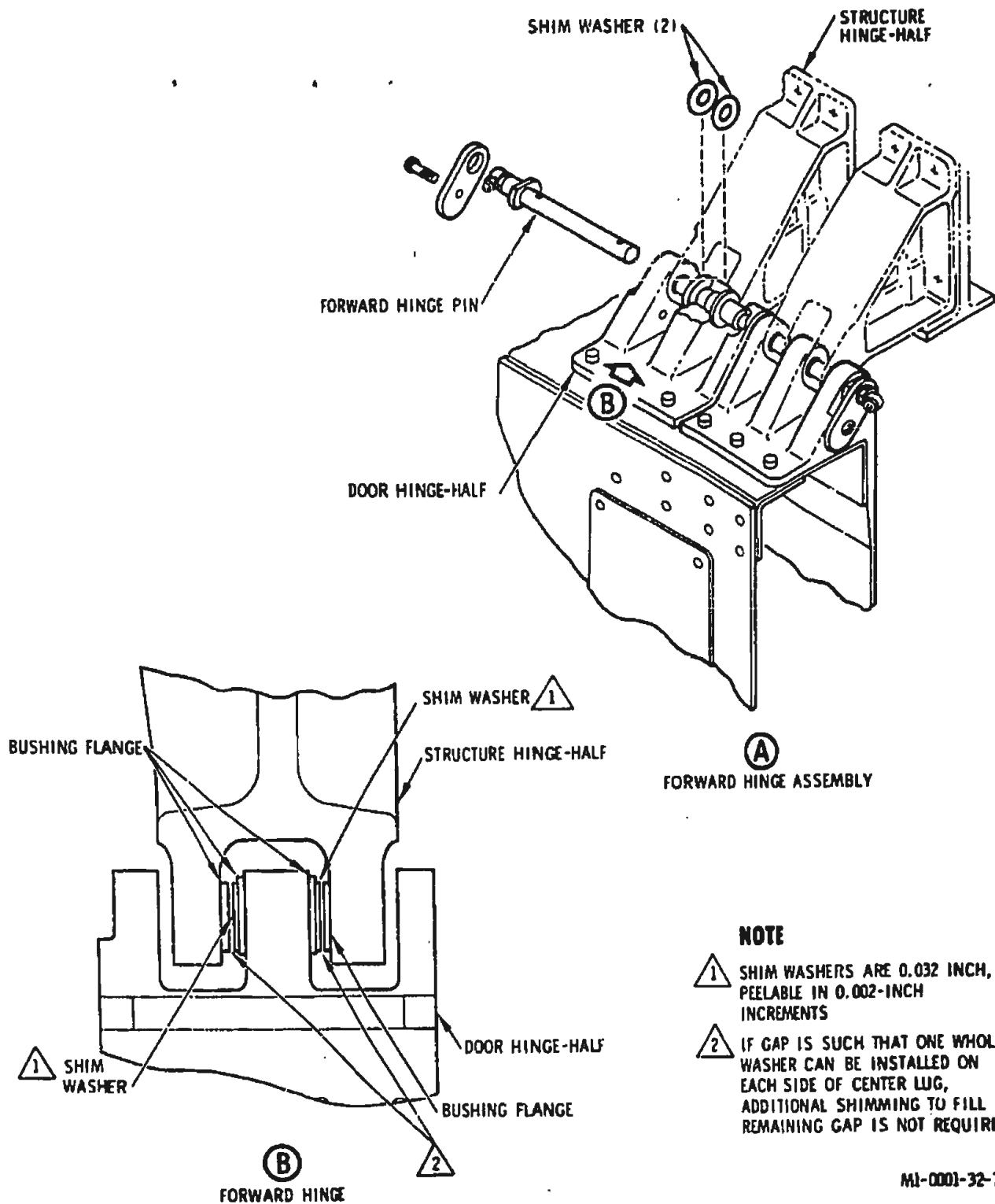
EFFECTIVITY: ALL

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32-12-01

Page 406
Mar 15/91

LOCKHEED
MAINTENANCE MANUAL



Forward Hinge Adjustment
Figure 403

EFFECTIVITY: ALL

32-12-01
Page 407/408
Aug 15/81

MAIN LANDING GEAR INBOARD DOOR - ADJUSTMENT AND TEST**1. General**

This procedure contains instructions for rigging the main landing gear inboard door and associated actuating mechanism. This procedure applies whether or not door seals are installed.

2. Equipment and Materials

Lock-wire, QQ-W-390, 0.040-inch diameter or equivalent

3. Referenced Procedures

- 29-11-00 Hydraulic Power System - Maintenance Practices
- R 32-33-00 Main Landing Gear Inboard Door - Maintenance Practices

4. Adjustment/Test**A. Preparation for Adjustment**

- (1) Ensure that NLG and MLG downlock safety pins are installed.
- (2) Ensure that flight station landing gear control lever is in DOWN position.
- R (3) Pull D-handles to open both MLG inboard doors and install MLG door actuator locks on both MLG doors (Ref. 32-33-00).
- R (4) Ensure that hydraulic system C pressure is 0 psi (Ref. 29-11-00).
- (5) Remove MLG door actuator safety lock from door being adjusted.

WARNING: DOOR AREA MUST BE CLEAR OF PERSONNEL AND EQUIPMENT BEFORE CLOSING DOOR.

- R (6) Close MLG door (Ref. 32-33-00).
- (7) Tag D-handle to prevent door operation.

B. Door Adjustment

EFFECTIVITY: ALL

001B

32-12-01
Page 501
May 15/82



MAINTENANCE MANUAL

- (1) Verify door rod end fittings to have thread engagement of 0.38 inch at both ends (Ref. Fig. 501).

NOTE: Door rod end fittings have left and right hand threads to simplify door rod length adjustment.

- (2) On aircraft 001-031 without SB32-118, adjust forward and aft stops until door lower profile is flush with surrounding fuselage structure within +0.03 inch to -0.07 inch. Secure with jamnuts.

- R (2) On aircraft 001-031 with SB32-118 and 032-999, adjust both forward and aft stops until profile of door lower edges (forward and aft) are inside contour 0.17 (± 0.10) inch at BL 105.0 (Ref. Fig. 502).

- (3) Adjust door rod length until door stops contact pads.

NOTE: It may be necessary to fine adjust door rod to obtain the required tolerance.

- (4) On aircraft 001-031 without SB32-118, rotate alignment roller adjustment bushings to adjust alignment rollers until door side surface is flush with surrounding fuselage structure within +0.03 inch to -0.07 inch. Ensure that both bushings on each alignment fitting lug are positioned the same, then install lock bolts.

- R (4) On aircraft 001-031 with SB32-118 and 032-999, rotate alignment roller adjustment bushings until door side surface is inside of interfacing structure within 0.12 (± 0.10) inch after assuring that both bushings at each alignment roller are adjusted equal amounts. Secure each alignment bushing with lock bolt and washer. Safety with lock-wire.

- (5) Safety door stops and bushing bolts with lock-wire (Ref. Fig. 501).

- (6) Ensure that tab stops are not loose. Tighten to secure as required.

NOTE: The tab pivots about an axis through the tab stops (Ref. Fig. 501). It is important that the tab stops are secured firmly enough to act as a pivot point.

- (7) On aircraft 001-031 without SB32-118, adjust tab fasteners so that the door tab outer edge surface is flush with wing fillet within +0.03 inch to -0.07 inch. Tab must be rigged so that when door is

EFFECTIVITY: ALL

32-12-01
Page 502
Nov 15/88

LOCKHEED
MAINTENANCE MANUAL

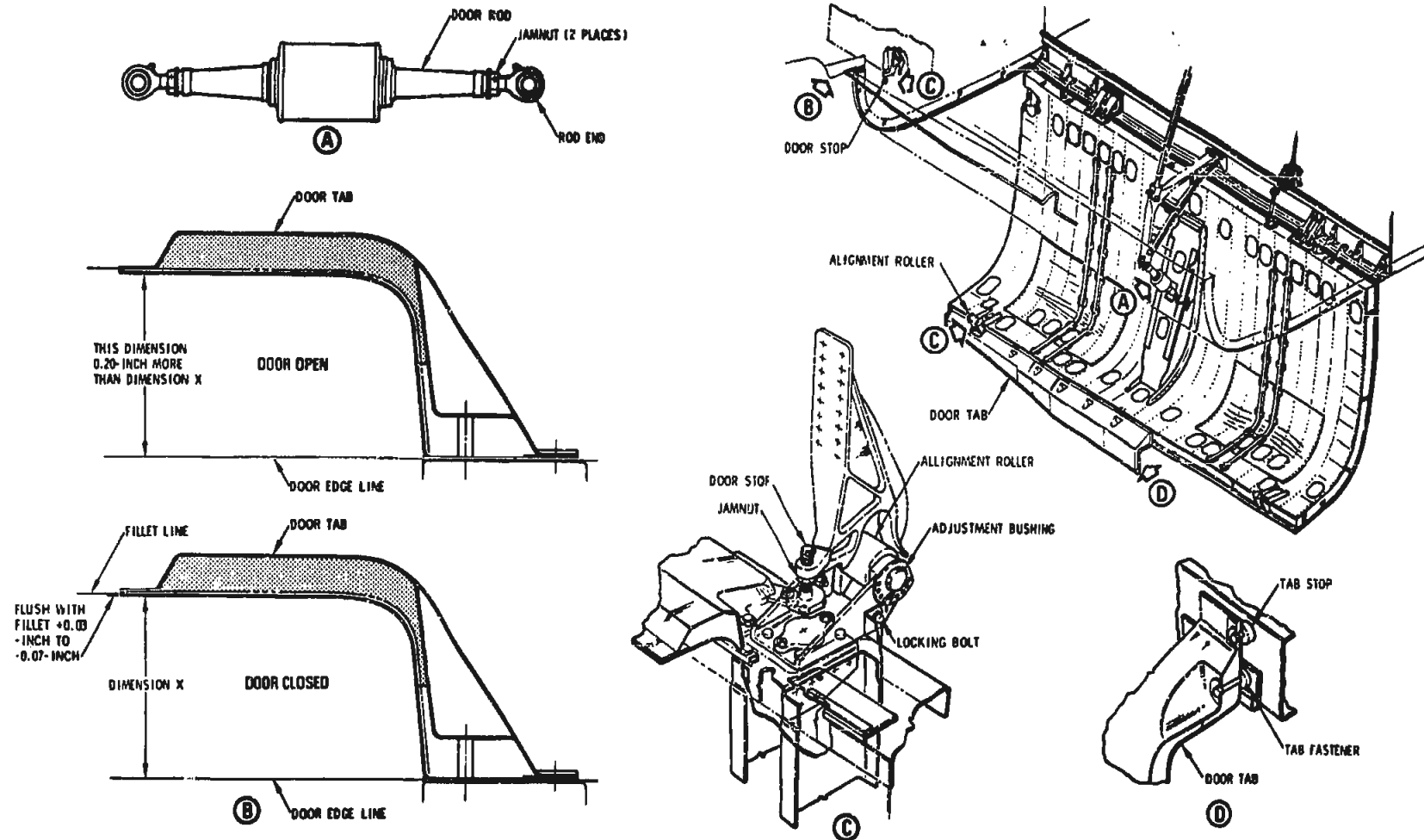
open, tab is 0.20 inch farther from edge of door than when door is closed (Ref. Fig. 501).

- R**
- (7) On aircraft 001-031 with S832-118 and 032-999, adjust tab fasteners so that tab outer edge surface is inside the interfacing wing fillet and strut door surfaces within 0.25 (± 0.05) inch. Tab must be rigged so that when door is open, tab is 0.20 inch farther from edge of door than when door is closed (Ref. Fig. 501).
 - (8) Pull D-handle to open MLG inboard door being adjusted and install MLG door actuator lock on door (Ref. 32-33-00).
 - (9) Shorten door rod 0.58 inch (4.6 turns).
 - (10) Lock rod ends with jamnuts and safety with lock-wire.
 - (11) Remove MLG door actuator safety lock from door being adjusted.
- WARNING:** DOOR AREA MUST BE CLEAR OF PERSONNEL AND EQUIPMENT BEFORE CLOSING DOOR.
- (12) Cycle door to ensure operation (Ref. 32-33-00). If door is properly adjusted, gap and mismatch measurements should be within tolerance (Ref. Fig. 502).
 - (13) Remove MLG door actuator safety lock from door not being adjusted and close both MLG doors (Ref. 32-33-00).
 - (14) Remove tags from D-handles.
 - (15) Turn off hydraulic system C pressure (Ref. 29-11-00).

EFFECTIVITY: ALL

001B

32-12-01
Page 503/504
Nov 15/88



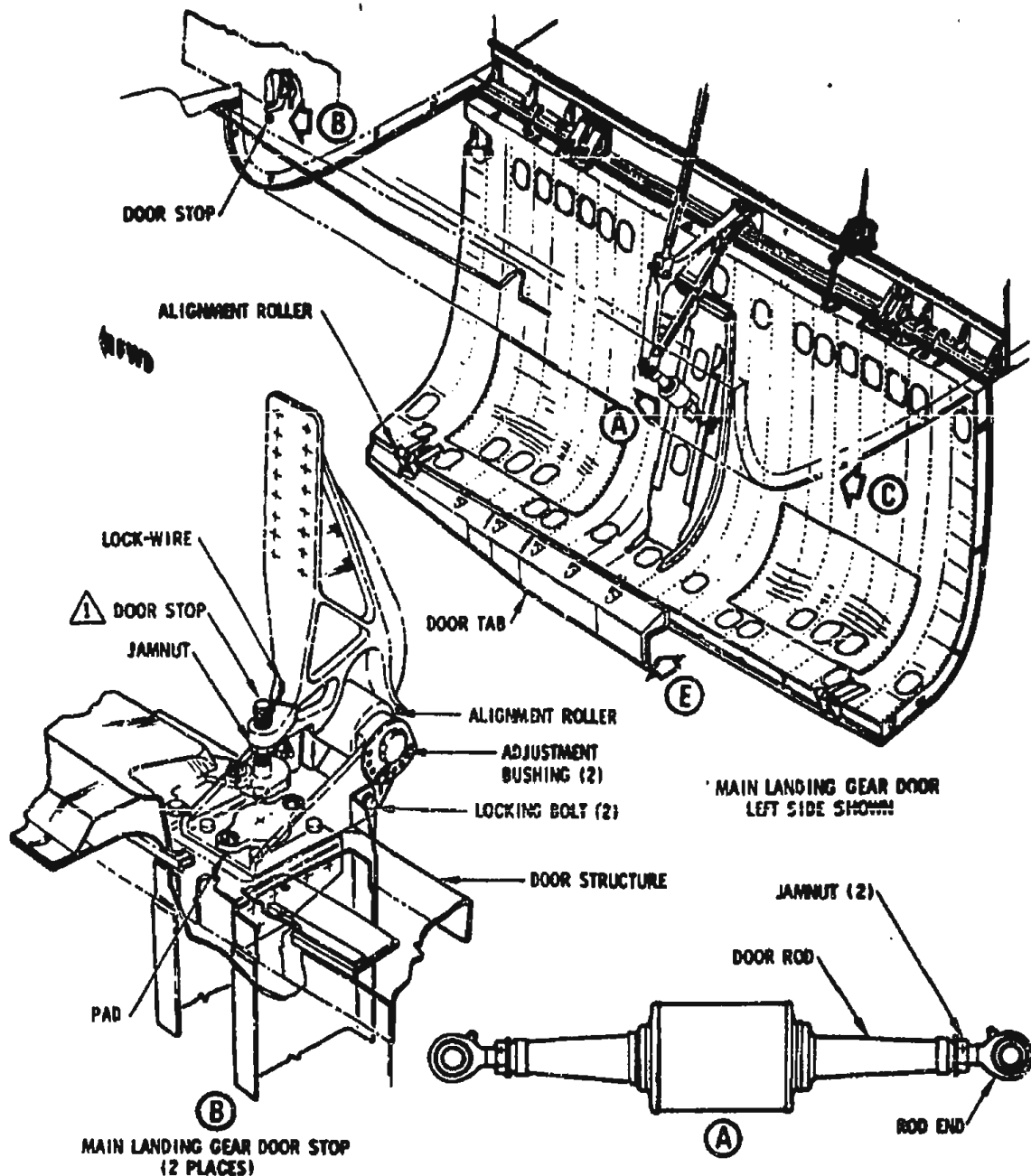
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R Main Landing Gear Inboard Door - Adjustment and Test
R Figure 501

EFFECTIVITY: 001-031 WITHOUT SB32-118

32-12-01
Page 505/506
Mar 15/80

LOCKHEED
MAINTENANCE MANUAL



NOTE
1 LOCATED ON DOOR, SURROUND STRUCTURE FORE AND AFT OF DOOR

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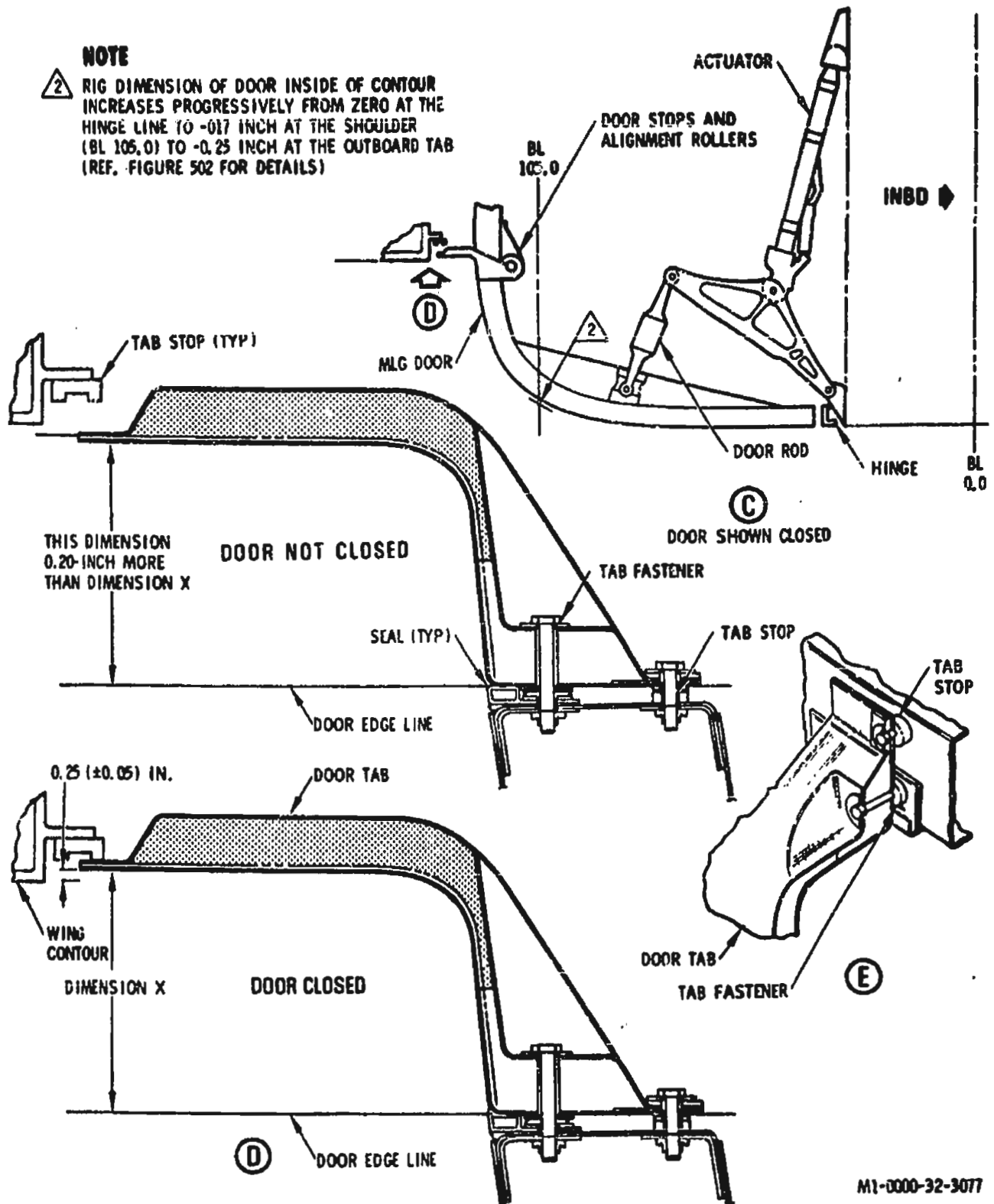
Main Landing Gear Inboard Door - Adjustment and Test
Figure 501 (Sheet 1)

R EFFECTIVITY: 001-031 WITH SB32-118 AND 032-999
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32-12-01
Page 507
Nov 15/88

LOCKHEED
MAINTENANCE MANUAL

NOTE
 2 RIG DIMENSION OF DOOR INSIDE OF CONTOUR INCREASES PROGRESSIVELY FROM ZERO AT THE HINGE LINE TO -0.17 INCH AT THE SHOULDER (BL 105.0) TO -0.25 INCH AT THE OUTBOARD TAB (REF. FIGURE 502 FOR DETAILS)



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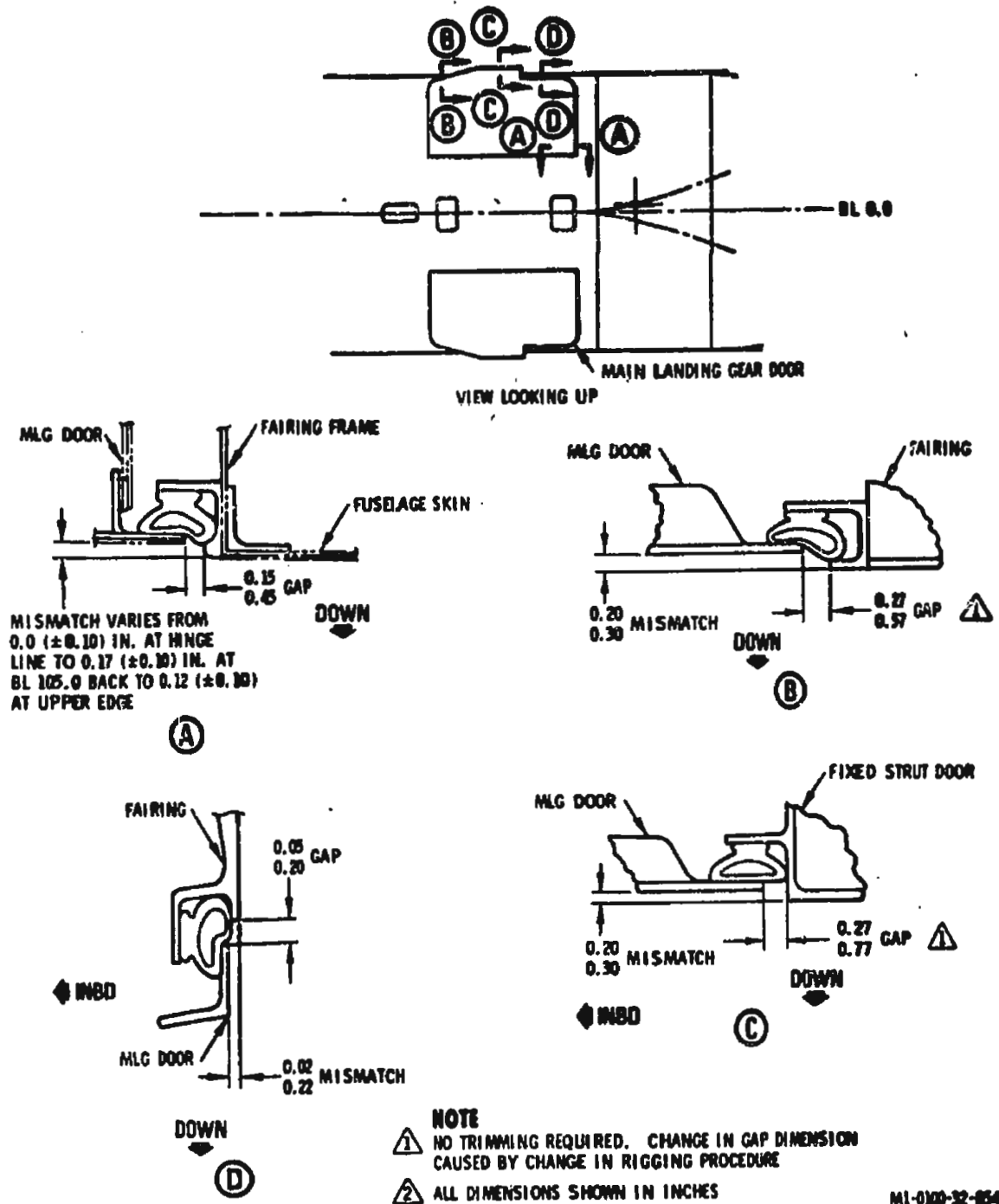
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Main Landing Gear Inboard Door - Adjustment and Test
Figure 501 (Sheet 2)

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001B EFFECTIVITY: 001-031 WITH SB32-118 AND 032-999

32-12-01
Page 508
Nov 15/88

LOCKHEED
MAINTENANCE MANUAL



Main Landing Gear Inboard Door Gap and Mismatch
Figure 502

R
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001B

EFFECTIVITY: 001-031 WITH SB32-118 AND 032-999

32-12-01
Page 509/510
Nov 15/88

**R** MAIN LANDING GEAR FIXED DOOR - REMOVAL AND INSTALLATION**R** 1. General

R This procedure contains instructions for removal and
R installation of the MLG fixed door. The fixed door is fastened
R to the strut in four places, two at the bottom and two at the
R top.

R On aircraft 001-031 with SB52-110 and 032-999,
R ensure the proper use of close tolerance bolts and bushings with
R snug fit holes incorporated in the door mount points and the
R attaching parts. This modification provides significant
R reduction of vibration induced wear.

R 2. Equipment and Materials

R Cotter pin, MS24665-32, or equivalent

R Torque Wrench (200 lb. in. capacity)

R Corrosion Preventive Compound, Solvent Cutback,
R Cold-Application, MIL-C-16173, or equivalent

R 3. Referenced Procedures

R 20-51-04 Environmental Sealing of Model L-1011 Airplane -
R PB75-425

R 32-12-02 Main Landing Gear Fixed Door - Adjustment and Test

R 4. Removal/Installation**R** A. Removal

R (1) At lower support link, remove cotter pin, nut, and
R washer securing door to forward side of strut (Ref.
R Fig. 401).

R (2) Remove nut, washer, and bolt securing door to aft side
R of strut.

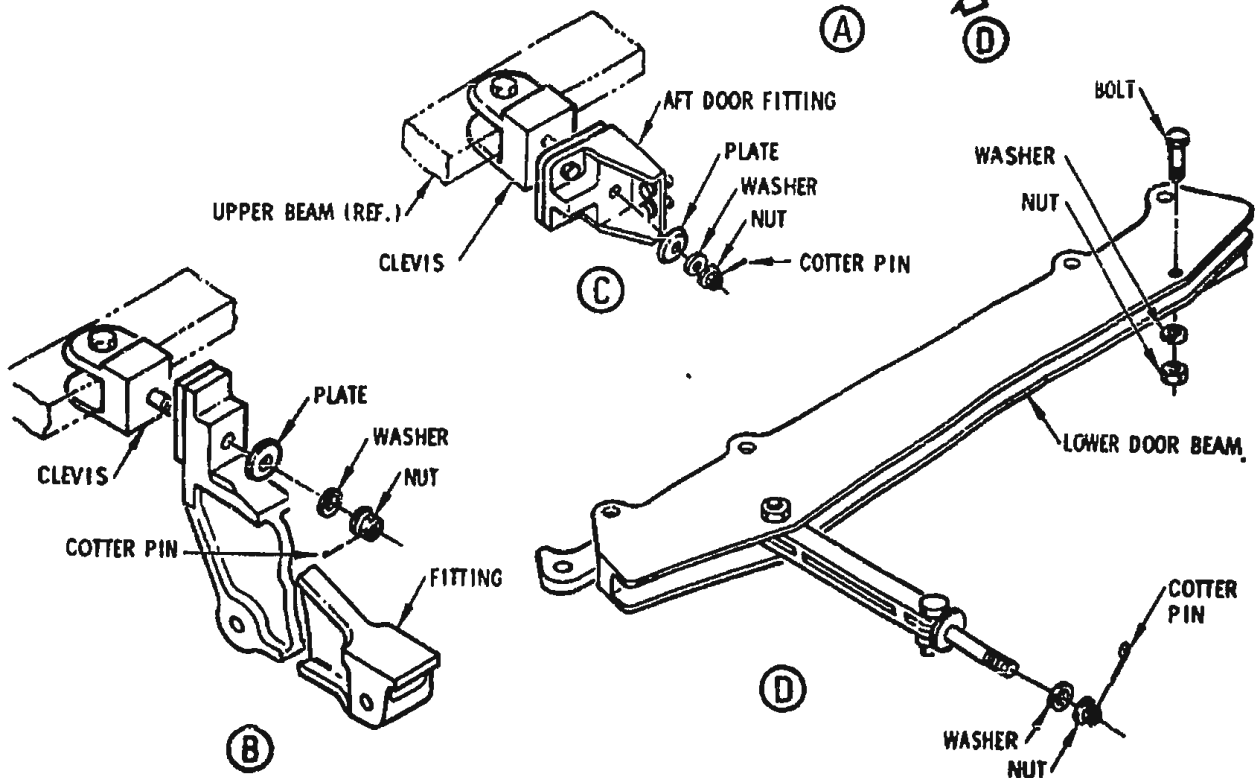
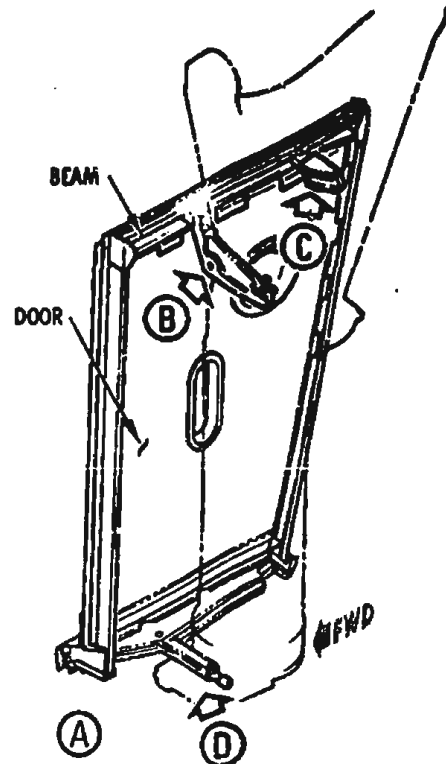
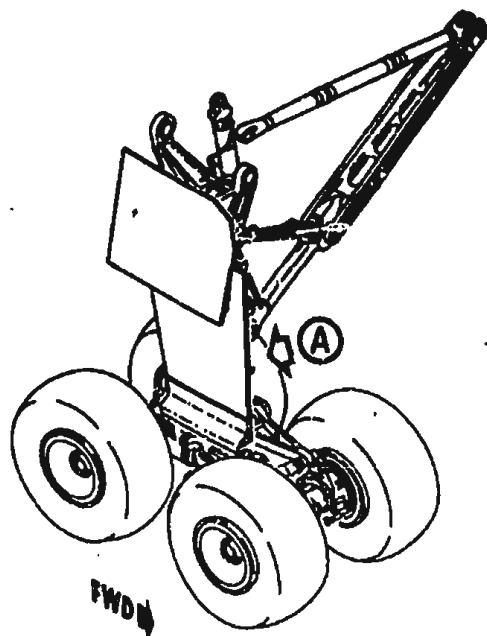
R (3) At upper support fitting, support door and remove
R cotter pins, nuts, washers, and plates securing door
R beam to forward and aft sides of strut.

R (4) Remove door.

R EFFECTIVITY: ALL

32-12-02
Page 401
Jun 15/94

LOCKHEED
MAINTENANCE MANUAL



M1-0002-32-566

Fixed Door - Removal and Installation
Figure 401

R
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002B

EFFECTIVITY: ALL

32-12-02
Page 402
Jun 15/94

**R B. New Door Buildup**

- R (1) At removed door upper beam aft end, remove nut, washer, and bolt securing beam assembly to door-to-beam fitting (Ref. Fig. 402).**
- R (2) At forward end, slide end of beam out of door fitting and bearing. Remove beam from door.**
- R (3) Remove nuts, washers, and bolts and remove bearing assembly from door forward fitting.**
- R (4) At aft end, remove nuts, washers, and bolts and remove door-to-beam fitting, spacers, and serrated plate from door fitting.**
- R (5) On new door, install upper beam as follows:**
- R (a) Install bearing to door forward door fitting. Do not tighten nuts.**
- R (b) Install door-to-beam fitting, spacers, and serrated plate to door aft fitting. Do not tighten nuts.**
- R (c) Insert forward end of beam into bearing, and secure aft end of beam to door-to-beam fitting. Torque nut sufficiently to bring it tight against washer. Gap is permissible under bolt head and between washer and nut.**
- R (6) At removed door lower forward and aft ends, remove nuts, washers, and bolts securing lower beam to door fittings.**
- R (7) Install lower beam on new door by securing both ends of lower beam to door fittings. Torque nuts sufficiently to bring them tight against washers. Gap is permissible under bolt heads and between washers and beam.**

R C. Installation

- R (1) Coat upper beam clevis and lower beam support link threads with environmental sealing compound (Ref. 20-51-04).**
- R (2) Hoist door into position.**
- R (3) Insert upper beam clevis bolts into forward and aft strut upper fittings and lower beam link bolt into lug on forward side of strut (Ref. Fig. 401).**

R EFFECTIVITY: ALL**R 002B****32-12-02**
Page 403
Jun 15/94

LOCKHEED



MAINTENANCE MANUAL

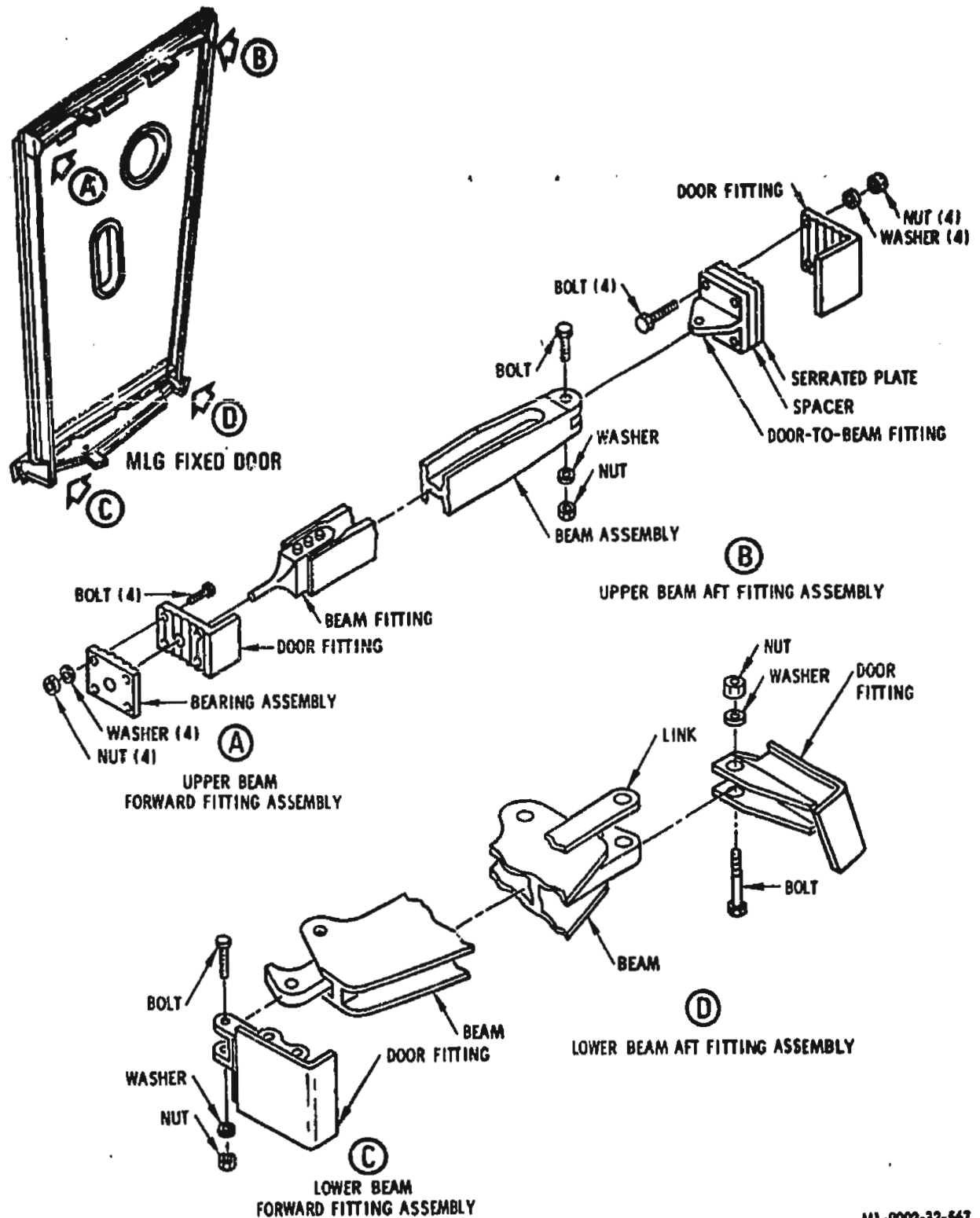
- R (4) Install plates, washers, and nuts on upper beam clevis
R bolts.
- R (5) Install washer and nut on lower beam support link bolt.
- R (6) Torque nuts to 180 lb in. Install cotter pins. Do not
R exceed 1/6 additional turn of nut to insert cotter pin.
- R (7) At lower beam aft end, coat bolt threads with
R environmental sealing compound, insert bolt and secure
R with washer and nut. Tighten nut against washer. Gap
R is permissible under bolt head or between washer and
beam.
- R (8) Adjust door (Ref. 32-12-02).

R EFFECTIVITY: ALL
R

002B

32-12-02
Page 404
Jun 15/94

LOCKHEED
MAINTENANCE MANUAL



M1-0002-32-567

**Main Landing Gear Fixed Door Fitting Disconnects
Figure 402**

EFFECTIVITY: ALL

32-12-02
Page 405/406
Jun 15/94

R
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002B

LOCKHEED
MAINTENANCE MANUAL

R MAIN LANDING GEAR FIXED DOOR - ADJUSTMENT AND TEST

R 1. General

R The main landing gear (MLG) hinged door must be disconnected
R from the strut to gain access to the fixed door outboard (upper)
R end (Ref. 32-12-03). The MLG inboard door must be disconnected
R from the door actuator mechanism to gain access to the fixed
R door inboard (lower) end, resulting in special procedures which
R must be followed when retracting and extending the gear (Ref.
R 32-32-00).

R 2. Referenced Procedures

R 7-11-00 Wing and Fuselage Jacking - Maintenance Practices
R 29-11-00 Hydraulic Power System - Maintenance Practices
R 32-12-03 Main Landing Gear Hinged Door - Adjustment and Test
R 32-32-00 Main Landing Gear Extension and Retraction -
R Maintenance Practices

R 3. Adjustment/Test

R A. Adjustment

- R (1) Jack aircraft for MLG retraction (Ref. 7-11-00).
- R (2) Install downlock safety pins in nose landing gear (NLG)
R and MLG not being retracted.
- R (3) At inboard (lower) end of fixed door, loosen bolts
R securing serrated plates at forward and aft ends of
R beam (Ref. Fig. 501).
- R (4) If not already done, loosen bolts securing serrated
R plates at forward and aft ends of outboard (upper)
R beam.
- R (5) Pull door away from strut as far as serrated adjustment
R plates will permit.
- R (6) Disconnect hinged door from strut (Ref. 32-12-03).

R WARNING: ENSURE THAT LANDING GEAR SWING AREA IS CLEAR OF
R EQUIPMENT AND PERSONNEL.

R EFFECTIVITY: ALL
R
002B

32-12-02
Page 501
Jun 15/94



MAINTENANCE MANUAL

- (7) Retract applicable MLG (Ref. 32-32-00). Do not turn off hydraulic system C pressure.
- (8) Position LANDING GEAR control lever to NEUTRAL.
- (9) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (10) In flight station, tag LANDING GEAR UPLOCK MECHANICAL RELEASE T-handles NOSE & BYPASS, LEFT MAIN, and RIGHT MAIN to prevent inadvertent operation.
- (11) Allow approximately 15 minutes for MLG uplock snubber to fully compress due to weight of MLG. Verify full compression by measuring (Ref, Fig. 502).

NOTE: On aircraft 001-031 without SB32-166, the uplock snubber may take more or less time than 15 minutes to fully compress. Proceed to Step (12) when dimension shown in Figure 502 is 1.50 (± 0.030) inches.

R

NOTE: On aircraft 001-031 with SB32-166 and 032-999, the uplock snubber may take more or less time than 15 minutes to fully compress. Proceed to Step (12) when dimension shown in Figure 502 is 2.125 (± 0.030) inches.

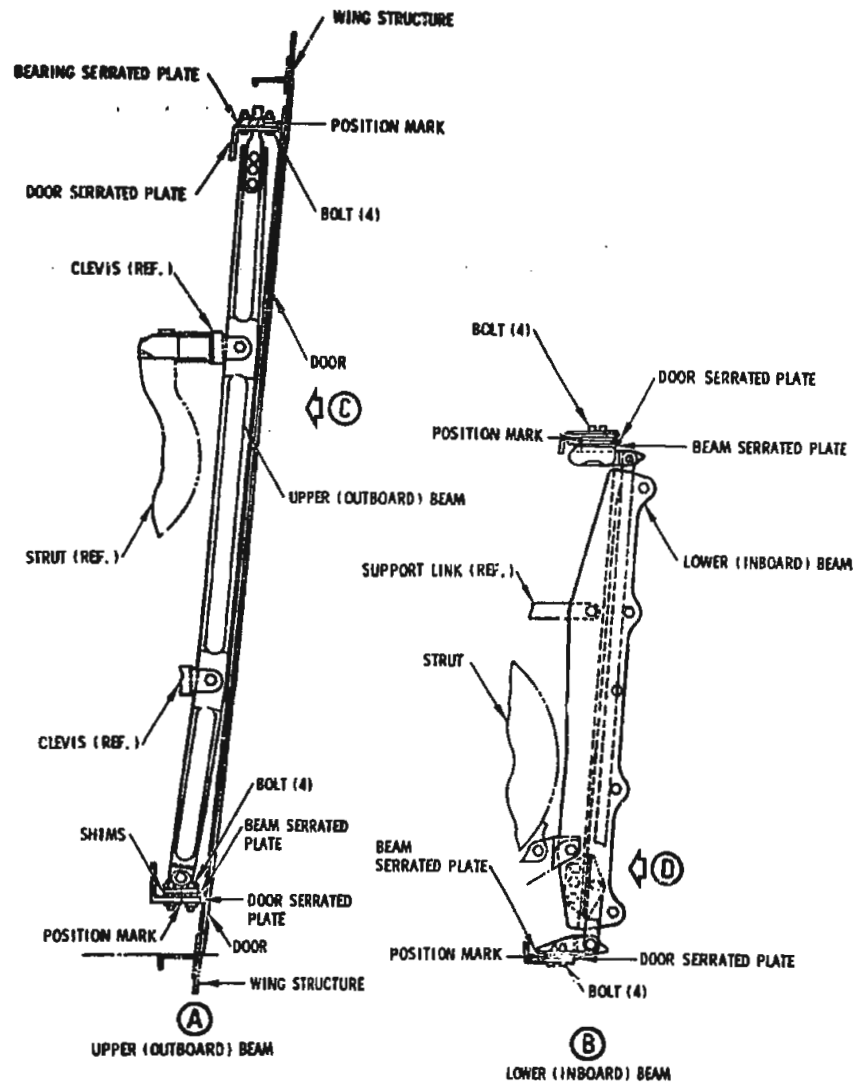
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- (12) Raise door flush with wing lower surface and check forward and aft centering in wing opening. If adjustment is required, increase or decrease shim thickness at top beam aft end, and reposition drag link at bottom beam aft end.
- (13) Center door laterally in wing opening and clamp door to wing structure at four corners.
- (14) Tighten two bolts at each upper and lower beam serrated plates (tighten only enough to hold door in position).
- (15) Verify that serrated plates are correctly aligned (no crossed serrations) and remove clamps.
- (16) Mark serrated plates for position.
- (17) Extend gear (Ref. 32-32-00).
- (18) Verify that serrated plates are marked clearly for location.
- (19) Reposition serrated plates, to obtain correct preload of door, in the following sequence:

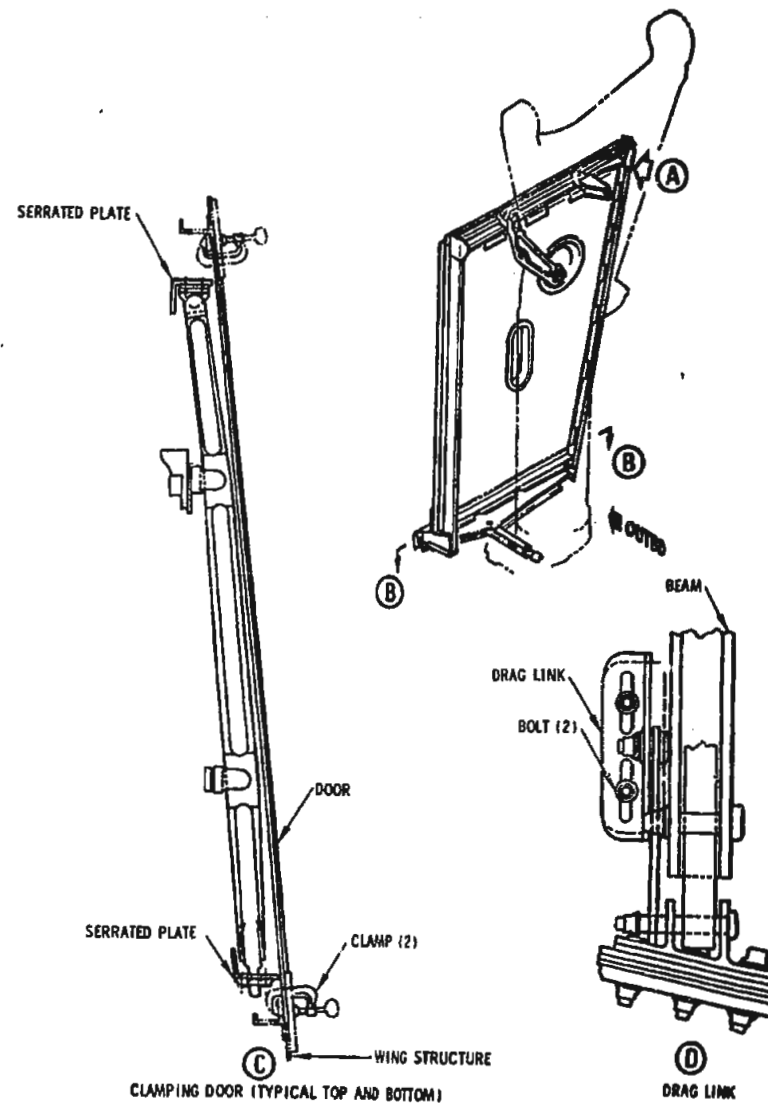
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32-12-02
Page 502
Jun 15/95



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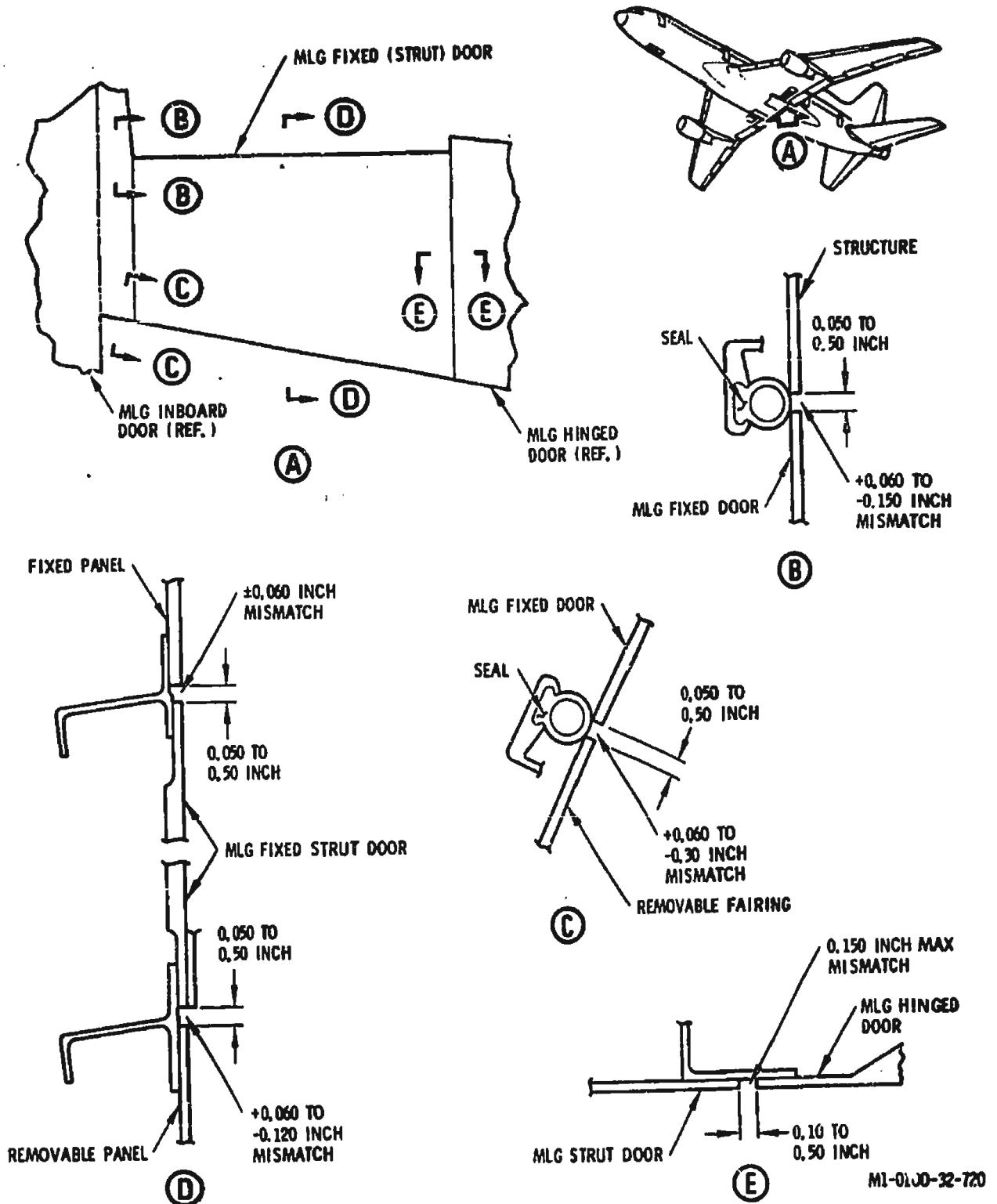
Main Landing Gear Fixed Door - Adjustment and Test
Figure 501 (Sheet 1)

32-12-02
Page 503/504
Jun 15/94

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EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL



Main Landing Gear Fixed Door - Adjustment and Test
Figure 501 (Sheet 2)

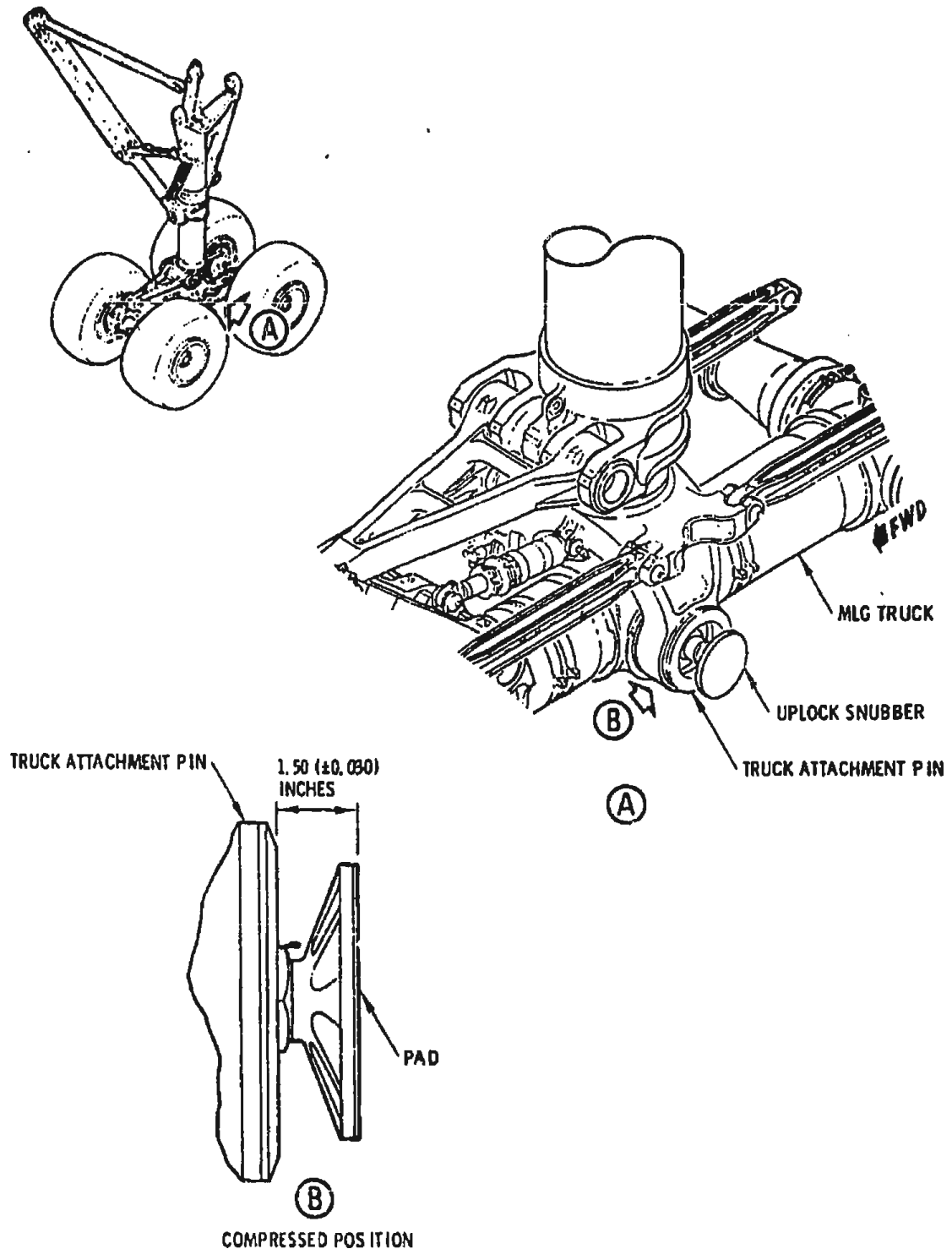
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R EFFECTIVITY: ALL

002B

32-12-02
Page 505
Jun 15/94

LOCKHEED
MAINTENANCE MANUAL



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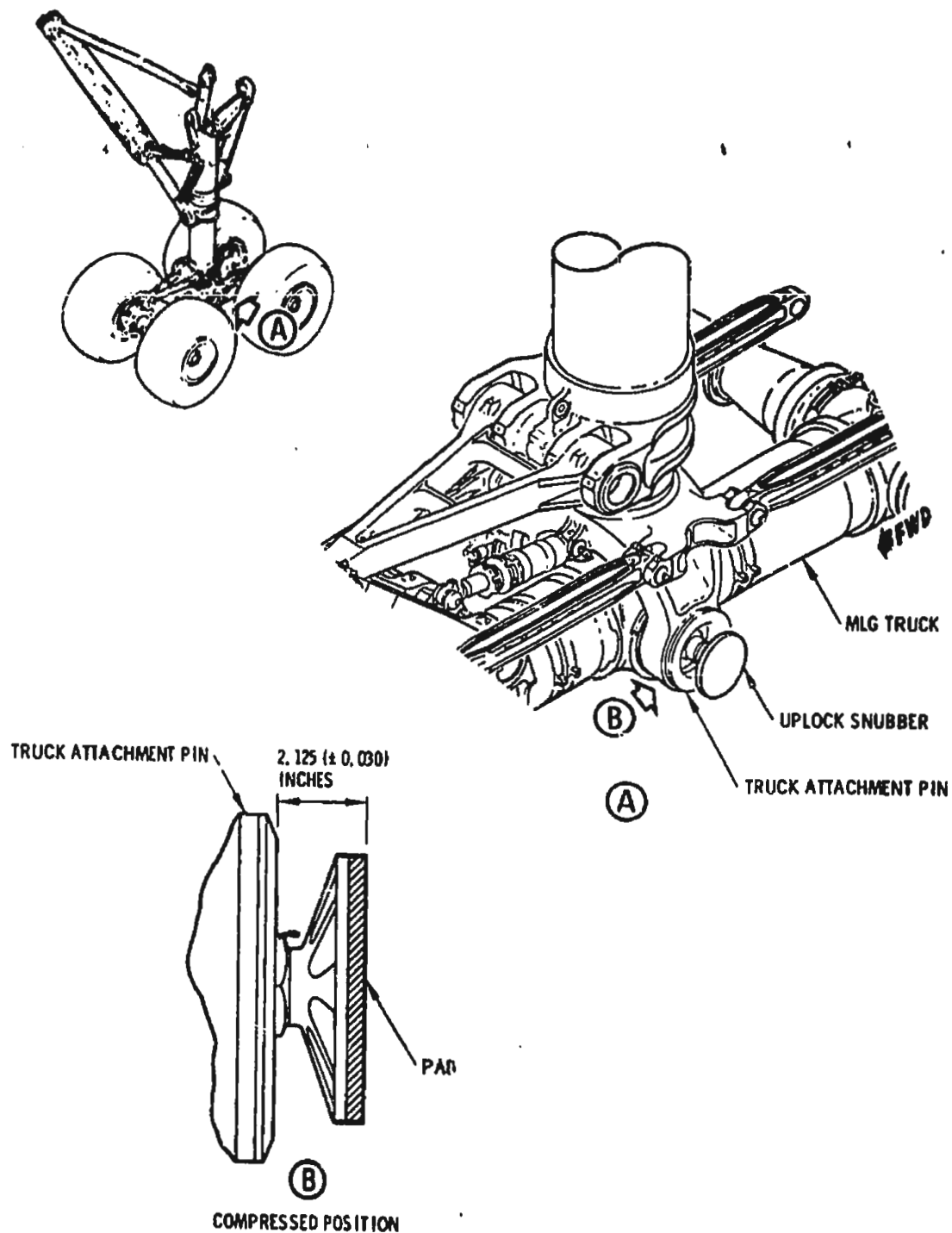
Main Landing Gear Uplock Snubber Compression Dimension
Figure 502

EFFECTIVITY: 001-031 WITHOUT SB32-166

002B

32-12-02
Page 506
Jun 15/95

LOCKHEED
MAINTENANCE MANUAL



M1-0000-32-3005

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Main Landing Gear Uplock Snubber Compression Dimension
Figure 502

EFFECTIVITY: 001-031 WITH SB32-166 AND 032-999

32-12-02
Page 507
Jun 15/95

002B



- (a) At outboard (upper) beam, loosen bolts securing serrated plates and move door toward strut 0.18 to 0.24 inch (3 to 4 serrations). Tighten two bolts sufficiently to hold door in position.
- (b) On aircraft 001-031 without SB32-166, at inboard (lower) beam, loosen bolts securing serrated plates and move door toward strut 0.06 to 0.12 inch (1 to 2 serrations). Tighten two bolts sufficiently to hold door in position.
- (b) On aircraft 001-031 with SB32-166 and 032-999, at inboard (lower) beam, loosen bolts securing serrated plates and move door toward strut 0.44 to 0.50 inch (7 to 8 serrations). Tighten two bolts sufficiently to hold door in position.

CAUTION: PRIOR TO FINAL TIGHTENING OF BOLTS SECURING THE SERRATED PLATES, CAUTION MUST BE EXERCISED TO PREVENT CROSSFEED SERRATIONS OR INCOMPLETE SERRATION ENGAGEMENT.

- (c) Verify that all serrations are aligned and fully engaged, then tighten all serrated plate bolts (4 per plate).

WARNING: ENSURE LANDING GEAR SWING AREA IS CLEAR OF EQUIPMENT AND PERSONNEL.

- (20) Retract gear (Ref. 32-32-00).
- (21) Check door fit (Ref. Figure 501, Sheet 2).
- (22) Extend gear (Ref. 32-32-00).
- (23) Perform completion procedure (Ref. 32-32-00).
- (24) Connect and adjust hinged door (Ref. 32-12-03).
- (25) Remove tags from LANDING GEAR UPLOCK MECHANICAL RELEASE T-handles.

R EFFECTIVITY: ALL

R
002B

32-12-02
Page 508
Jun 15/95

LOCKHEED
MAINTENANCE MANUAL

R MAIN LANDING GEAR FIXED DOOR - INSPECTION AND CHECK

R 1. General

R This procedure applies to fixed doors which are secured to the
R main landing gear (MLG) strut at three support positions.

R 2. Inspection/Check

R A. Inspect door supports and beams as follows (Ref. Fig. 601):

- R (1) Inspect upper beam and supports for breaks, cracks or
R bending.
- R (2) Inspect center support casting for cracked or broken
R parts.
- R (3) At each center support end-spring assembly, check for
R 1-1/2 threads of clevis shaft protruding through
R self-locking nut. If less than 1-1/2 threads protrude,
R remove nut and install new nut (P/N LH 7559-6) and
R tighten until at least 1-1/2 threads protrude and all
R end play in shaft is removed.
- R (4) Inspect serrated clevis attachment plates to verify
R that serrations are fully engaged and that all three
R clevis attachment plate bolts are tight. If any
R serrations are crossed, no matter how slight, perform
R the following:
- R (a) Record clearance between clevis and door channel.
- R (b) Loosen all three clevis attachment plate bolts.
- R (c) Align plate until serrations are parallel.
R Maintain clearance recorded in Step (a).
- R (d) If necessary, loosen clamp nut on center support
R and position support axially along strut until
R clearances on each end of support are within
R tolerance. Tighten clamp nut.
- R (e) Tighten clevis attachment plate bolts.
- R (5) Inspect lower beam and support for broken parts.
- R B. Check door for looseness in excess of normal clearance
R between parts. Excessive clearance can indicate worn or
R failed parts. Repair and replace parts as required.

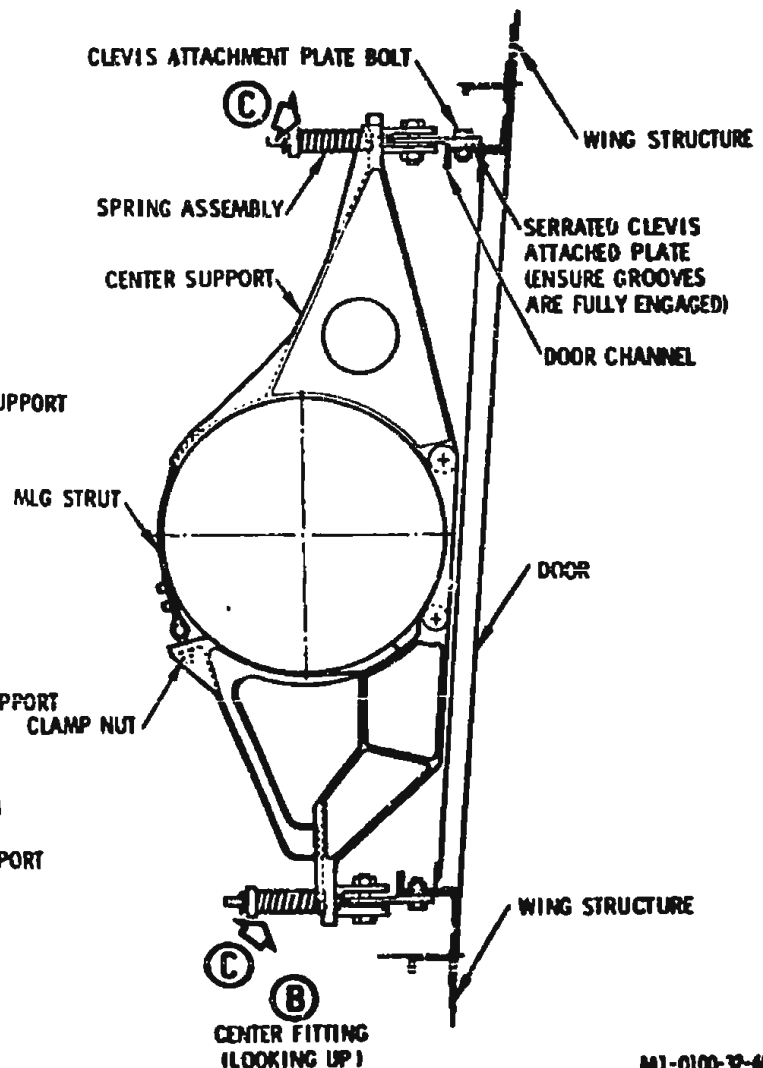
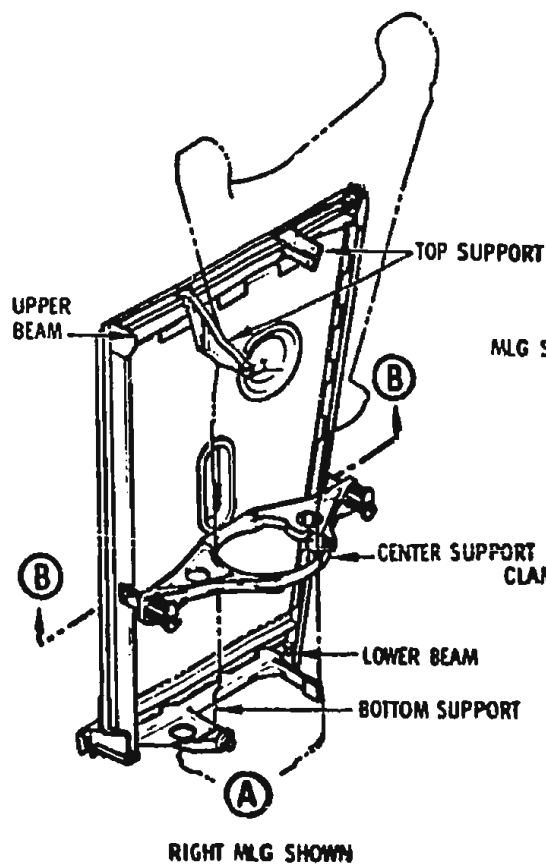
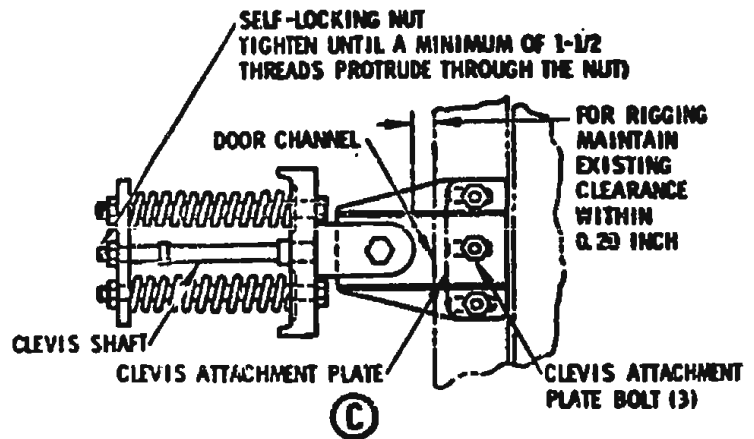
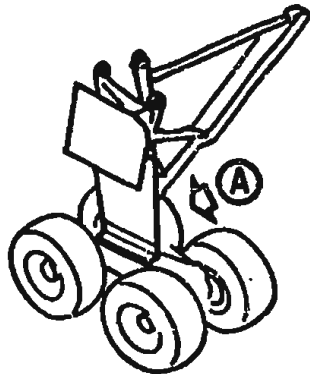
EFFECTIVITY: AIRCRAFT 001-031 WITHOUT SB52-074

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MAINTENANCE MANUAL

R
R

NOTE: Refer to Structural Repair Manual for repair procedures.

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MAINTENANCE MANUAL



M1-0100-32-605

R
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Fixed Door Inspection
Figure 601

EFFECTIVITY: AIRCRAFT 001-031 WITHOUT SB52-074

818B

32-12-02
CONFIG-1
Page 603/604
Nov 15/78

LOCKHEED
MAINTENANCE MANUAL

R MAIN LANDING GEAR FIXED DOOR - INSPECTION AND CHECK

R 1. General

R This procedure applies to fixed doors that have been modified by
R SB52-074 and are secured to the main landing gear (MLG) strut at
R three support positions.

R 2. Inspection/Check

R A. Inspect door supports and beams as follows (Ref. Fig. 601).

R (1) Inspect upper beam and supports for breaks, cracks or
R bending.

R (2) Inspect all strut attach hardware for cracks, looseness
R or bending.

R (3) Inspect serrated bearing attachment plates to verify
R the serrations are fully engaged and that all plate
R attachment bolts are tight. If any serrations are
R crossed, no matter how slight, serrations must be
R aligned properly.

R NOTE: Care must be taken not to alter door rigging and
R clearances.

R (4) Inspect lower beam and supports for breaks, cracks or
R bending.

R (5) Check door for looseness in excess of 0.030 inches
R clearance between parts.

R (6) If excessive looseness is found, replace door or modify
R according to SB52-110.



MAIN LANDING GEAR HINGED DOOR - REMOVAL AND INSTALLATION

1. General

This procedure contains instructions for removal and installation of the main landing gear hinged door (PN 1529059). The door is fastened to the wing structure by two double-linked hinge assemblies and to the strut by a two-way double link consisting of a beam and clevis bolt which is connected to the strut by an eye-bolt. When it is necessary to remove or install the hinge halves secured to the aircraft structure, perform Steps 4C and 4D.

C To install hinged door 1566649-() on aircraft 11001 through
C 11014, obtain new hinge fwd assy 1577642-103(LH) or -104(RH) and
C new hinge aft assy 1577643-101 (LH) or -102 (RH), and
C inter-changeability kit A01791-1(LH) or -2(RH). Follow
C S/B52-046 instructions to install door, door hinges, and kit
CR parts on MLG trunion rib. Refer then to Maint. Manual 32-12-02,
CR Config. 2, to attach door links to MLG strut and complete rig
C and adjustment.

The following items are to be used for installation of the hinged door (PN 1529059):

ITEM	QUANTITY	PART NUMBER
Hinge, Forward Assy	1	1533490
Hinge, Aft Assy	1	1533489
Bolt, Upper, Forward Hinge	2	MS21250-04010
Bolt, Lower, Forward Hinge Aft Hinge	5	MS21250-04014
Bolt, Lower Forward Hinge	1	MS21250-05020
Bolt, Upper, Aft Hinge	2	MS21250-04012
Washer, Forward Hinge, under bolt MS21250-05020 head	1	MS20002C5

EFFECTIVITY: 001-014 WITHOUT SB52-046

LOCKHEED



MAINTENANCE MANUAL

ITEM	QUANTITY	PART NUMBER
Washer, Forward Hinge, under nut of MS21250-05020 bolt	1	MS20002-5
Washer, Aft Hinge, two forward bolts, Forward Hinge, under lower center bolt head	2	AN960-10L
Block, Forward Hinge, under nut of MS21250-05020 bolt (See NOTE 1)	1	1523666-209
Nut, Forward Hinge, Aft Hinge	9	LH7559-4
Nut, Forward Hinge	1	LH7559-5
Bolt, Clevis to Eye-bolt	1	NAS1108-24D
Nut, Clevis to Eye-bolt	1	MS17826-8
Washer, Clevis to Eye-bolt	2	AN960-816
Nut, Eye-bolt	1	425W-820
Washer, Eye-bolt	1	MS20002-10
Eye-bolt	1	1533795-101

NOTE: Block should be retained with removed hinge assembly unless replacing door (PN 1566649) is not being secured with nut retainers. If nuts are used to secure forward hinge, block must be used the same as it is used on replaced door (PN 1529059).

R EFFECTIVITY: 001-014 WITHOUT SB52-046
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001B

32-12-03

CONFIG-1
Page 402
Aug 15/82

LOCKHEED
MAINTENANCE MANUAL

2. Equipment and Materials

Jack Pad Adapters

Wing Jack

Forward Fuselage Jack

Cotter Pin, MS24665-302, or equivalent

Cotter Pin, MS24665-298, or equivalent

Cotter Pin, MS24665-155, or equivalent

Cotter Pin, MS24665-149, or equivalent

R Grease, Ref. MM 12-20-00, Lubrication, Scheduled Servicing
Low Adhesion Sealing Compound, LAC Spec C-40-769, or equivalent

3. Referenced Procedures

7-11-00	Wing and Fuselage Jacking - Maintenance Practices
20-51-04	Environmental Sealing of Model L-1011 Airplane
32-12-03	Main Landing Gear Hinged Door - Adjustment and Test
32-30-00	Landing Gear Retraction and Extension - Maintenance Practices
32-33-00	Main Landing Gear Inboard Door - Maintenance Practices

4. Removal/Installation

A. Removal

- (1) Jack aircraft to a height of approximately 35 inches, to permit retracting main landing gear (Ref. 7-11-00).
- (2) Insert downlock safety pins in the nose landing gear and in the main landing gear opposite the landing gear from which the hinged door is to be removed.
- (3) Open both MLG inboard doors and install door actuator locks (Ref. 32-33-00).
- (4) Remove bolt(s) connecting hinged door clevis bolt(s) to door beam assembly (Ref. Fig. 401).

EFFECTIVITY: 001-014 WITHOUT SB52-046

32-12-03
CONFIG-1
Page 403
Dec 15/93



MAINTENANCE MANUAL

- (5) Retract main landing gear from which hinged door is being removed (Ref. 32-30-00).
- (6) Remove cotter pins from lower hinge pins (Ref. Fig. 401).
- (7) Remove hinge pins.

NOTE: Bearing and washers of aft hinge will be released when hinge pin is removed, but carriers must be removed separately.

- (8) Swing door inboard until link pins are exposed enough for removal.
- (9) Support door, then remove link pins.
- (10) Remove door.
- (11) Remove upper hinge pins and links.

B. Installation

- (1) Clean and inspect all parts for wear and damage.
- (2) Thinly lubricate hinge pins, link pins, bearings, carriers, and links before installation with grease.
- (3) At forward and aft wing structure hinge fittings, install upper hinge pins, inside washers, (unmodified hinges) links, and spacers. Install washer and safety with MS24665-149, or equivalent, cotter pins.
- (4) Support door in position and install link pins through links and both door hinge fittings.

NOTE: If lower link pin has a head incorporated, ensure that head faces aft.

- (5) Safety with MS24665-298, or equivalent, cotter pins.

NOTE: Minimum axial movement may be attained by using one of two holes in each carrier for safetying.

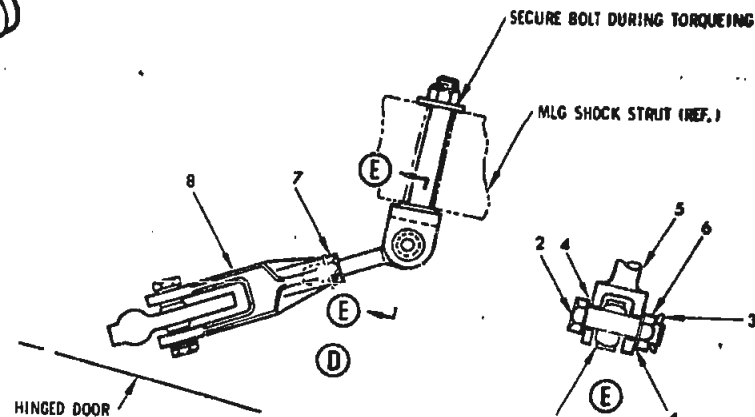
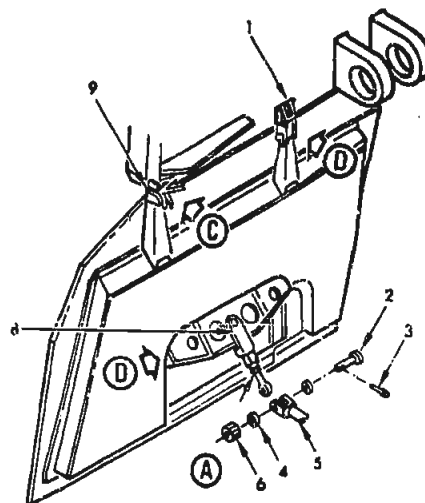
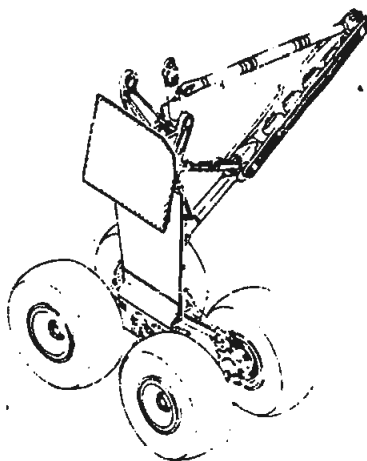
- (6) Extend main landing gear (Ref. 32-30-00).
- (7) Install bolt(s) connecting hinged door clevis bolt(s) to door swing beam assembly (Ref. Fig. 401). Tighten nut(s) snug against clevis. Do not bend legs of clevis.
- (8) Perform door adjustment and test (Ref. 32-12-03).

R EFFECTIVITY: 001-014 WITHOUT SB52-046

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001B

32-12-03
CONFIG-1
Page 404
Dec 15/93

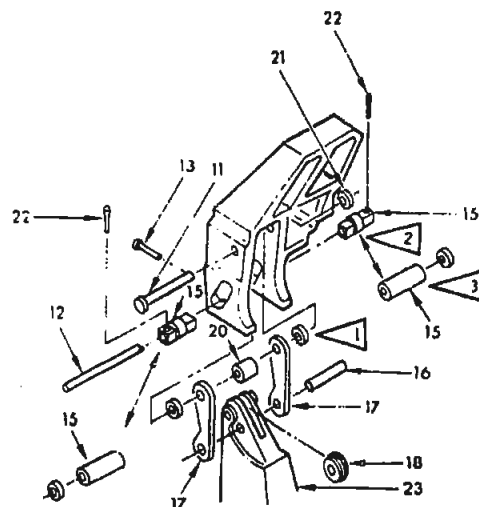


- 1 AFT HINGE ASSEMBLY (1533489)
- 2 BOLT (NAS1108-240)
- 3 COTTER PIN (MS24665-302)
- 4 WASHER (2 PLACES) (AN960-816)
- 5 EYE-BOLT (LS33795-101)
- 6 NUT (425W-820)
- 7 LOCKNUT
- 8 CLEVIS
- 9 FORWARD HINGE ASSEMBLY (1533490)
- 10 WING STRUCTURE AFT HINGE FITTING
- 11 UPPER HINGE PIN
- 12 LOWER HINGE PIN
- 13 COTTER PIN (MS24665-149)
- 14 WASHER (4)
- 15 CARRIER (4)
- 16 LINK PIN (2)
- 17 LINK PIN (4)
- 18 BEARING TRACK (2)
- 19 DOOR AFT HINGE FITTING
- 20 SPACER (2)
- 21 WASHER (2)
- 22 COTTER PIN (MS24665-289)
- 23 DOOR FORWARD HINGE FITTING
- 24 AFT HINGE PIVOT PIN

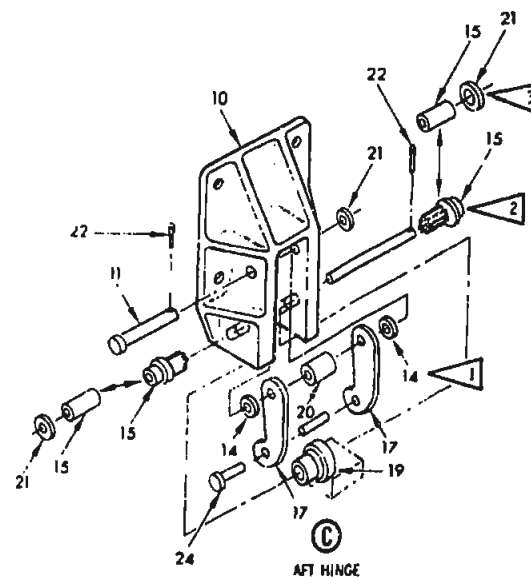
 EFFECTIVITY
REMOVED BY SB 52-050

 CARRIER REMOVED BY SB 52-095 (2 PLACES)

 CARRIER AND WASHER INSTALLED BY
SB 52-095 (2 PLACES)



(B)
FORWARD HINGE



(C)
AFT HINGE

MI-11402-32-431

Main Landing Gear Hinged Door - Removal and Installation
Figure 401

32-12-03
CONFIG-1
Page 405/406
Sep 15/79

745B EFFECTIVITY: 001-014 WITHOUT SB52-046

LOCKHEED
MAINTENANCE MANUAL

- (9) Remove MLG inboard door actuator lock and close inboard door (Ref. 32-33-00).
- (10) Install downlock safety pin in main landing gear to which door was installed.
- (11) Lower aircraft, using jacks (Ref. 7-11-00).

C. Hinge Assembly Removal

(1) Forward Hinge

- (a) Remove door in accordance with Step 4A.
- (b) Remove upper bolts (MS21250-04010) (Ref. Fig. 402).
- (c) Remove shims and spacer.
- (d) Remove two lower bolts (MS21250-04014).
- (e) Remove remaining lower bolt (MS21250-05020) and block 1523666-209.
- (f) Remove hinge and shims.

(2) Aft Hinge

- (a) Remove bolts (Ref. Fig. 402).
- (b) Remove serrated plate and shim.
- (c) Remove hinge.

D. Hinge Assembly Installation

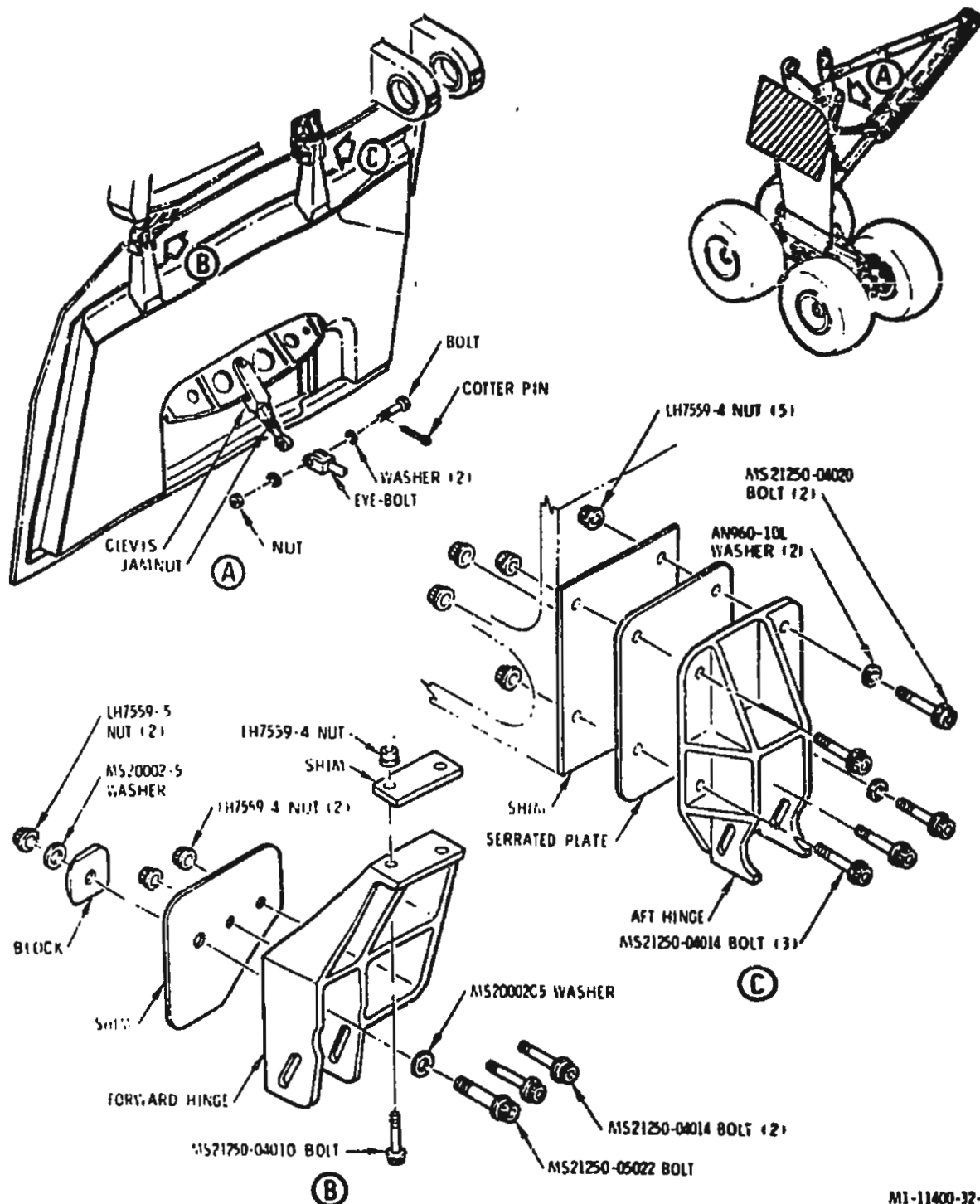
(1) Forward Hinge

- (a) Apply low adhesion sealing compound (Ref. 20-51-04) to both sides of shim (1523666-185) (Ref. 20-51-04).
- (b) Position shim and hinge in place and secure in place with lower, aft bolt (MS21250-04014) and nut (LH7559-4). Do not tighten nut (Ref. Fig. 402).
- (c) Place washer (AN960-10L) over center bolt (MS21250-04014) and washer (MS20002C5) over forward bolt (MS21250-05020).
- (d) Install both bolts and secure center bolt with nut (LH7559-4). Do not tighten nut.



- (e) Position block (1523666-209) on forward bolt, place washer (MS20002-5) on bolt, and secure with nut (LH7559-5). Do not tighten nut.
 - (f) Apply low adhesion sealing compound to both sides of shim (LS5909F015-0202) and shim (LS15222N015-202).
 - (g) Position both shims between hinge top and wing structure.
 - (h) Install bolts (MS21250-04010).
 - (i) Secure with nuts (LH7559-4). Do not tighten nuts.
- (2) Aft Hinge
- (a) Apply low adhesion sealing compound (Ref. 20-51-04) to both sides of shim (1523666-187) and serrated plate (1566184-101).
 - (b) Position shim, plate, and hinge in place and install lower forward and center bolts (MS21250-04014) (Ref. Fig. 402).
 - (c) Place washer (AN960-10L) over lower aft bolt (MS21250-04014) and install bolt.
 - (d) Place washer (AN960-10L) over upper aft bolt (MS21250-04012) and install bolt.
 - (e) Install upper forward bolt (MS21250-04012).
 - (f) Secure aft hinge bolts with nuts (LH7559-4). Do not tighten nuts.
- (3) Install door in accordance with Step 4B.

LOCKHEED
MAINTENANCE MANUAL



M1-11400-32-402

Main Landing Gear Hinged Door Hinge - Removal and Installation
Figure 402

R EFFECTIVITY: 001-014 WITHOUT SB52-046

745B

32-12-03
CONFIG-1
Page 409/410
Sep 15/79

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR HINGED DOOR - REMOVAL AND INSTALLATION

1. General

This procedure contains instructions for removal and installation of the main landing gear (MLG) hinged door (PN 1566649). The door is fastened to the wing structure by two hinge assemblies and to the strut by a two-way double link, consisting of a beam, and clevis bolt which is connected to the strut by an eye-bolt. When it is necessary to remove or install the hinge halves secured to the aircraft structure, perform Steps 4C and 4D.

If the hinged door (PN 1566649) is to be replaced by a hinged door (PN 1529059), refer to installation procedure (Ref. 32-12-03, CONFIG 1).

2. Equipment and Materials

Jack Pad Adapters

Wing Jack

Forward Fuselage Jack

Cotter Pin, MS24665-155, or equivalent

R Grease, Ref. MM 12-20-00, Lubrication, Scheduled Servicing

Low Adhesion Sealing Compound, LAC Spec C-40-769, or equivalent

3. Referenced Procedures

7-11-00 Wing and Fuselage Jacking - Maintenance Practices

20-51-04 Environmental Sealing of Model L-1011 Airplane

32-12-03 Main Landing Gear Hinged Door - Adjustment and Test

32-30-00 Landing Gear Retraction and Extension - Maintenance Practices

32-33-00 Main Landing Gear Inboard Door - Maintenance Practices

EFFECTIVITY: 001-014 WITH SB52-046 AND 015-999

32-12-03
CONFIG-2
Page 401
Dec 15/93

LOCKHEED
MAINTENANCE MANUAL

4. Removal/Installation

A. Removal

- (1) Jack aircraft to a height of approximately 35 inches, to permit retracting main landing gear (Ref. 7-11-00).
- (2) Insert downlock safety pins in nose landing gear and main landing gear opposite landing gear from which hinged door is to be removed.
- (3) Open applicable MLG inboard door and install door actuator lock (Ref. 32-33-00).
- (4) Remove bolt(s) connecting hinged door clevis bolt(s) to door beam assembly (Ref. Fig. 401).
- (5) Retract main landing gear from which hinged door is being removed (Ref. 32-30-00).
- (6) Support door and remove hinge pins.
- (7) Remove door.

B. Installation

- (1) Clean and inspect all parts for wear and damage.
- (2) Lubricate hinge pins with grease.
- (3) Support door in position and install hinge pins.
- (4) Install washers and nuts.
- (5) Safety nuts with cotter pins.
- (6) Extend main landing gear (Ref. 32-30-00).
- (7) Install bolt(s) connecting hinged door clevis bolt(s) to door beam assembly (Ref. Fig. 401). Tighten nut(s) snug against clevis. Do not bend legs of clevis.
- (8) Perform door adjustment and test (Ref. 32-12-03).
- (9) Remove MLG inboard door actuator lock and close inboard door (Ref. 32-33-00).
- R (10) Install downlock safety pin in main landing gear to
R which door was installed.
- R (11) Lower aircraft using jacks (Ref. 7-11-00).

EFFECTIVITY: 001-014 WITH SB52-046 AND 015-999



Figure 401

RR

CONFIG-2

Page 403/404
Sep 15/79

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR HINGED DOOR - ADJUSTMENT AND TEST

1. General

Adjustment of the main landing gear fixed door must be completed prior to adjustment of the hinged door.

2. Equipment and Materials

Cotter Pin, MS24665-302, or equivalent

Lock-wire, QQ-W-390, Temp A, 0.042-inch diameter, or equivalent

3. Referenced Procedures

29-11-00 Hydraulic Power System - Maintenance Practices

32-12-02 Main Landing Gear Fixed Door - Adjustment and Test

32-32-00 Main Landing Gear Extension and Retraction -
Maintenance Practices

4. Adjustment/Test

A. Adjustment

NOTE: The following procedures are presented for one door; the opposite door is adjusted in the same manner.

- (1) At hinged door to strut linkage, disconnect rod end from eyebolt (Ref. Fig. 501).
- (2) Loosen rod-end jamnut.
- (3) Remove wing access panel 641FB or 541FB, as applicable.
- (4) Retract applicable MLG (Ref. 32-32-00). Do not turn off hydraulic system C pressure.
- (5) Ensure that landing gear swing area is clear of equipment and personnel, and position LANDING GEAR control lever to NEUTRAL.
- (6) Turn off hydraulic system C pressure (Ref. 29-11-00).

R EFFECTIVITY: 001-014 WITHOUT SB52-046

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745B

32-12-03
CONFIG-1
Page 501
Sep 15/79



MAINTENANCE MANUAL

- (7) In flight station, tag NOSE & BYPASS, LEFT MAIN, and RIGHT MAIN LANDING GEAR UPLOCK MECHANICAL RELEASE T-handles to prevent inadvertent operation.
- (8) Allow approximately 15 minutes for MLG uplock snubber to fully compress due to weight of MLG. Verify full compression by measuring (Ref. Fig. 502).

NOTE: On aircraft 001-014 without SB32-166, the uplock snubber may take more or less time than 15 minutes to fully compress. Proceed to Step (9) when dimension shown in Figure 502 is 1.50 (± 0.030) inches.

R

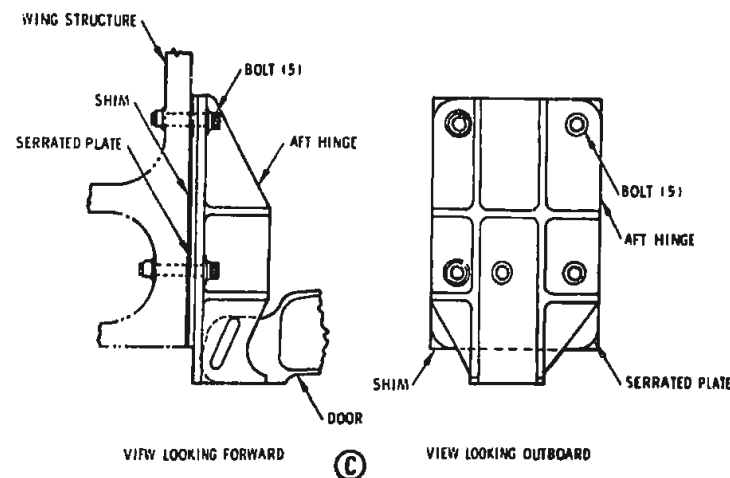
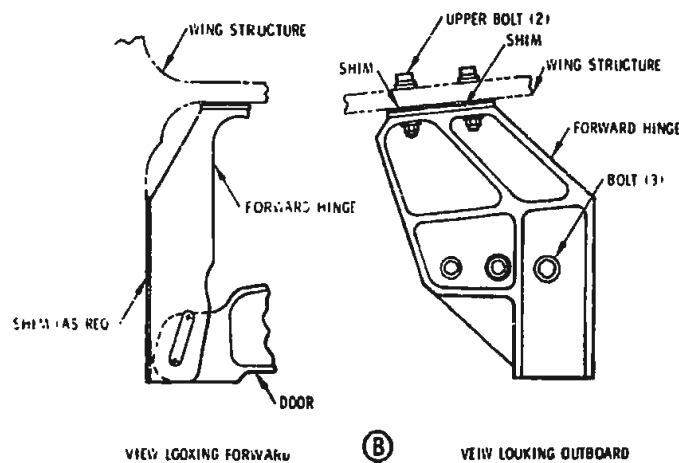
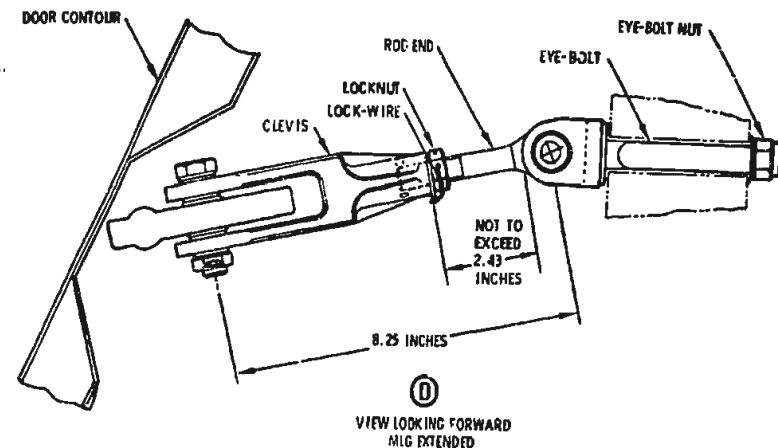
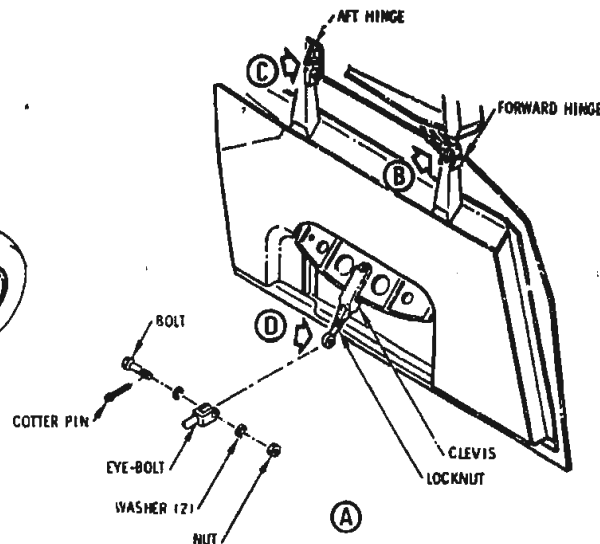
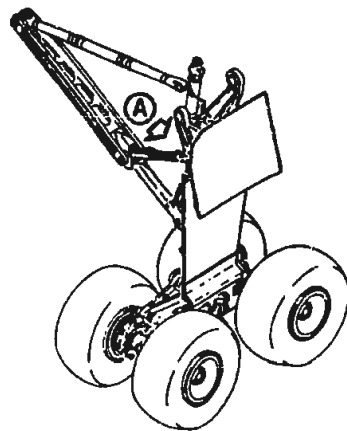
NOTE: On aircraft 001-014 with SB32-166, the uplock snubber may take more or less time than 15 minutes to fully compress. Proceed to Step (9) when dimension shown in Figure 502 is 2.125 (± 0.030) inches.

R

R

- (9) Verify that MLG fixed strut door is correctly adjusted. If not, adjust as required (Ref. 32-11-02).
- (10) Loosen bolts securing hinges so that bolts are approximately in center of hinge slot.
- (11) Close door by hand to check centering of door in door opening (Ref. Fig. 503, VIEWS B, C, D, E, and F). If door is not centered within tolerance, proceed as follows:
 - (a) Position door forward or aft as applicable and as limited by bolt hole clearance.
 - (b) Adjust door inboard or outboard by increasing or decreasing shim thickness between hinges and wing structure. Maximum shim thickness is 0.030 inch.
 - (c) Adjust a cocked door by increasing shim thickness on one hinge and decreasing shim thickness on the other. Care must be exercised to not exceed allowable gap tolerances (Ref. Fig. 503). Maximum shim thickness is 0.030 inch.
- (12) Close door by hand to check mismatch. Each inboard door corner should touch wing structure frame.
- (13) Adjust door hinges as follows to obtain inboard corner fit:

EFFECTIVITY: 001-014 WITHOUT SB52-046



Main Landing Gear Hinged Door - Adjustment and Test
Figure 501

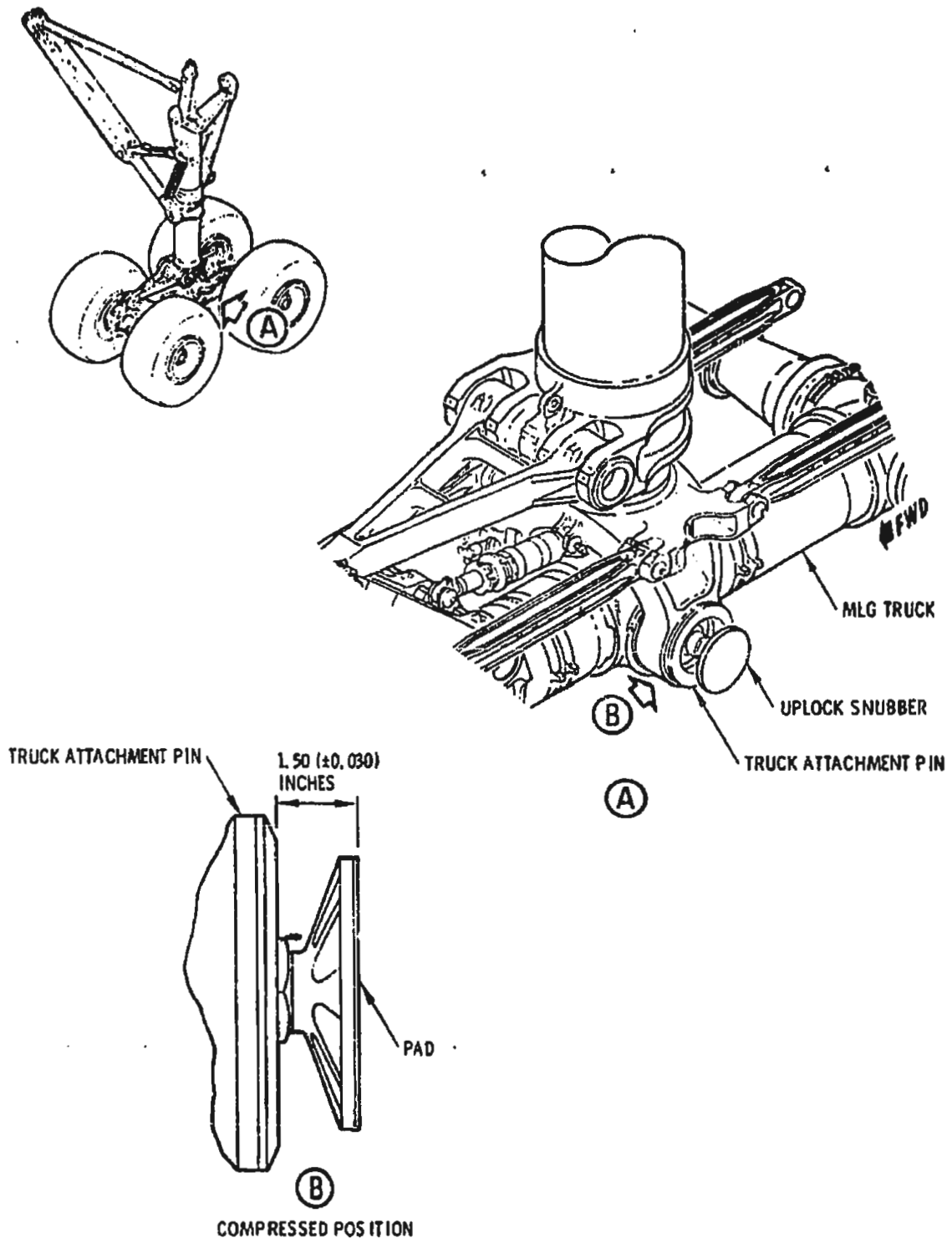
R EFFECTIVITY: 001-014 WITHOUT SB52-046

745B

32-12-03
CONFIG-1
Page 503/504
Sep 15/79

MI-11402-32-427

LOCKHEED
MAINTENANCE MANUAL



W1-0004-32-484

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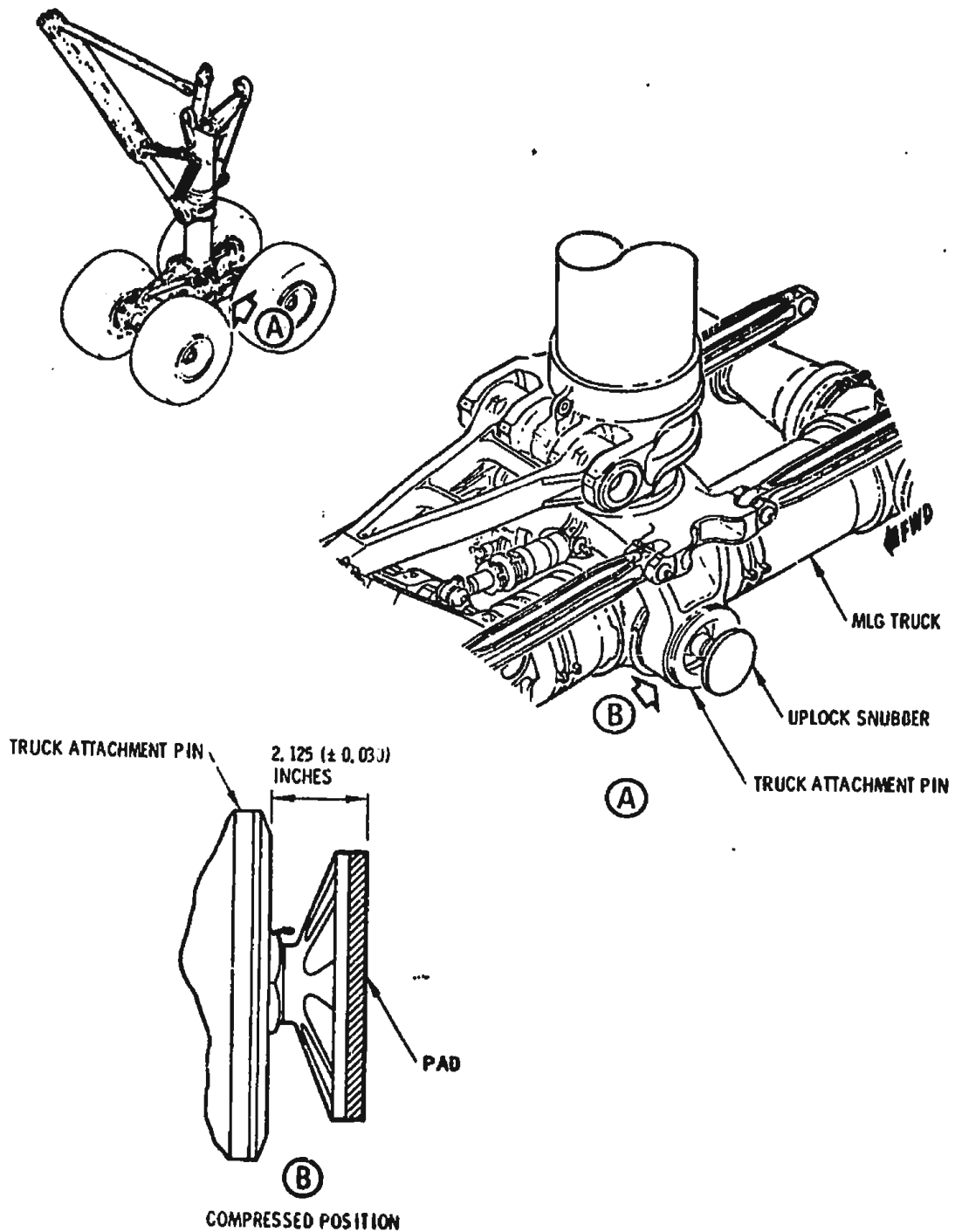
Main Landing Gear Uplock Compression Dimension
Figure 502

EFFECTIVITY: 001-014 WITHOUT SB32-166

002B

32-12-03
CONFIG-1
Page 505
Jun 15/95

LOCKHEED
MAINTENANCE MANUAL



M1-0000-32-3005

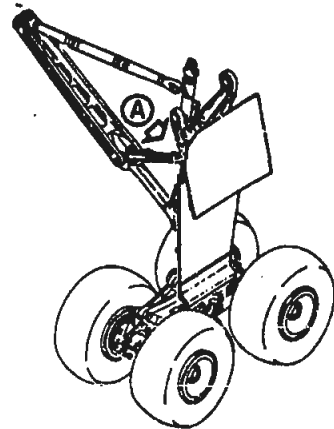
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Main Landing Gear Uplock Compression Dimension
Figure 502

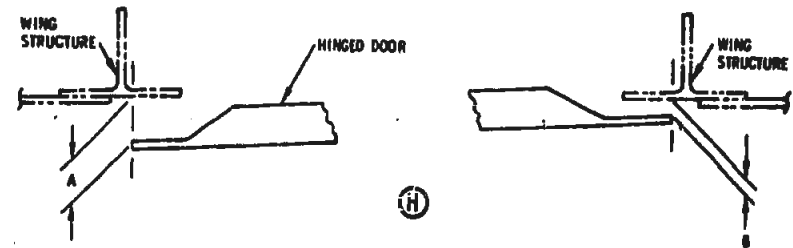
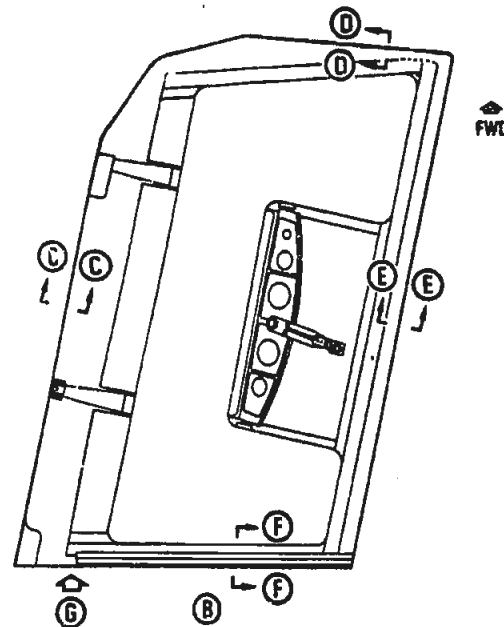
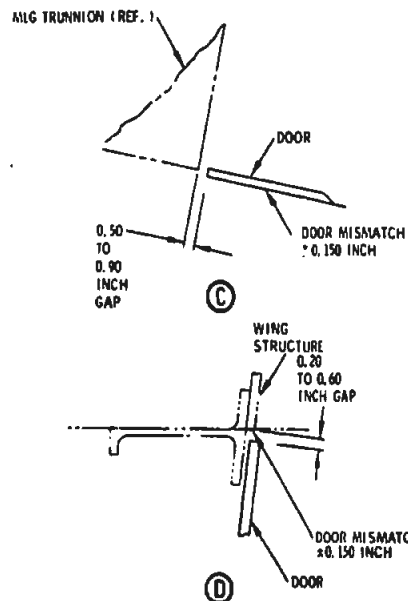
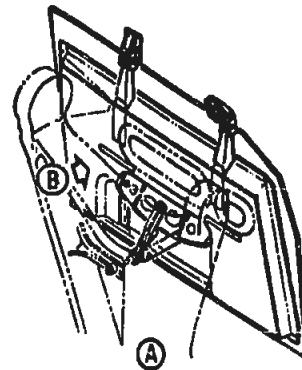
EFFECTIVITY: 001-014 WITH SB32-166

32-12-03
CONFIG-1
Page 506
Jun 15/95

002B

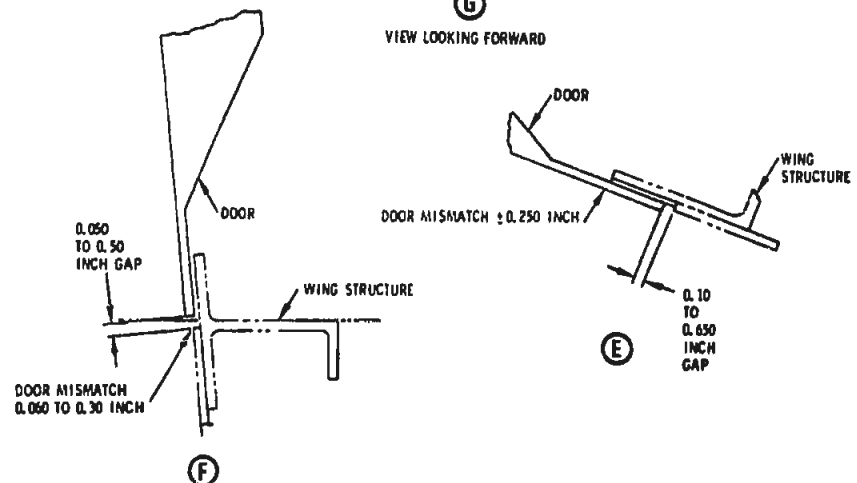
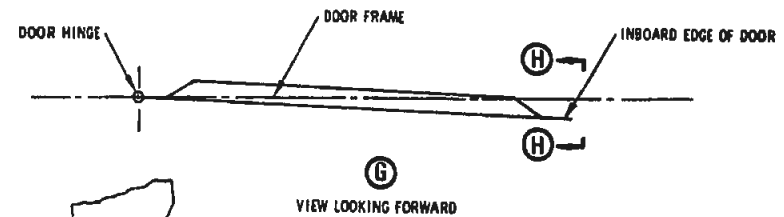


LEFT MAIN LANDING GEAR



DIMENSIONS IN INCHES

AVERAGE GAP $\frac{A+B}{2}$	0.00 TO 0.16	0.17 TO 0.24	0.25 TO 0.32	0.33 TO 0.40	0.41 TO 0.48	0.49 TO 0.56	0.57 TO 0.64	0.65 TO 0.72	0.73 TO 0.80	0.81 TO 0.88	0.89 TO 0.96	0.97 TO 1.04
TURNS TO CLOSE GAP		3 1/2	4	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8	8 1/2



M1-11401-32-226

Main Landing Gear Hinged Door Fit
Figure 503

R EFFECTIVITY: 001-014 WITHOUT SB52-046

7458

32-12-03
CONFIG-1
Page 507/508
Sep 15/79



MAINTENANCE MANUAL

- (a) If forward edge of door is too low or too high, move forward hinge up or down, as applicable, to obtain required fit.
- (b) Insert shims of required thickness between upper surface of hinge and wing structure until door is correctly aligned (Ref. Fig. 501).
- (c) If aft edge of door is too low or too high, move aft hinge up or down on serrated plate, as applicable to obtain required fit.
- (d) Tighten bolts securing hinges.
- (e) Door mismatch (door below wing contour) at outboard edge must not exceed 0.150 inch. Care must be exercised to prevent preloading door at forward and aft outboard edges.
- (14) On aircraft 015-031 with SB52-111, adjust the seals and plates installed along the ringed edge of the MLG hinged door to zero gap with the wing structure.
- (15) Adjust clevis link to 8.25 inches (Ref. Fig. 501). Tighten jamnut but do not safety with lock-wire.
- (16) Open door fully and secure out of way to prevent door damage when landing gear is extended.
- (17) Extend MLG (Ref. 32-32-00).
- (18) If necessary, recycle MLG to check door fit (Ref. 32-32-00).
- (19) Orient strut eye-bolt such that clevis bolt can be connected to eye-bolt. Secure eye-bolt to prevent rotation and torque eye-bolt nut 800 to 840 lb in.
- (20) Attach clevis bolt rod end to strut eye-bolt. Do not tighten nut.
- (21) Retract MLG (Ref. 32-32-00).
- (22) Measure gap between forward and aft inboard corners, and door opening structure (Ref. Fig. 503, VIEW H). Convert average gap as measured to turns required to close door (Ref. Fig. 503, VIEW G).
- (23) Extend MLG (Ref. 32-32-00).

R EFFECTIVITY: 001-014 WITHOUT SB52-046

R

002B

32-12-03
CONFIG-1
Page 509
Jun 15/95



- (24) Disconnect clevis bolt rod end from strut eye-bolt. Turn rod end to shorten clevis bolt the required number of turns determined in Step 4A(21).

NOTE: One turn is one complete revolution of the rod end or 360 degrees of rotation. Distance from center of rod end hole to shoulder of door-to-strut linkage fitting should not exceed 2.43 inches (Ref. Fig. 501).

- (25) Inspect clevis bolt for sufficient thread engagement by checking clevis witness hole or applicable dimension from clevis to eye-bolt lug (Ref. Fig. 501 VIEW D).

CAUTION: TURNING ROD END TO ACHIEVE ADEQUATE THREAD ENGAGEMENT PER DIMENSIONAL METHOD CAN RESULT IN EXCESSIVE DOOR PRELOAD IF DIMENSION IS LESS THAN APPLICABLE PRESCRIBED MINIMUM TOLERANCES SHOWN IN FIGURE 501.

- (26) Retract MLG (Ref. 32-32-00).
- (27) Check for door smoothness (mismatch) (Ref. Fig. 503).
- (28) Extend MLG (Ref. 32-32-00).
- (29) Tighten rod-end lock nut and safety with lock-wire.
- (30) Tighten all fasteners. Safety clevis rod-end to eye-bolt nut with cotter pin.
- (31) Install wing access panel removed in Step 4A(3).
- (32) Perform completion procedure (Ref. 32-32-00).
- (33) Remove tags from NOSE & BYPASS, LEFT MAIN, and RIGHT MAIN LANDING GEAR UPLOCK MECHANICAL RELEASE T-handles.

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR HINGED DOOR - ADJUSTMENT AND TEST

1. General

Adjustment of the main landing gear fixed door must be completed prior to adjustment of the hinged door.

2. Equipment and Materials

R Jack Pad Adapters

R Wing Jack

R Forward Fuselage Jack

Cotter Pin, MS24665-302, or equivalent

Lock-wire, QQ-W-390, Temp A, 0.042-inch diameter, or equivalent

3. Referenced Procedures

R 7-11-00 Wing and Fuselage Jacking - Maintenance Practices
32-12-02 Main Landing Gear Fixed Door - Adjustment and Test
32-32-00 Main Landing Gear Extension and Retraction -
Maintenance Practices

4. Adjustment/Test

A. Adjustment

NOTE: The following procedures are presented for one door; the opposite door is adjusted in the same manner.

- R (1) Jack aircraft to a height so that MLG tires clear
R ground by 6 inches to permit retracting main landing
R gear (Ref. 7-11-00).
- R (2) Insert downlock safety pins in nose landing gear and
R main landing gear opposite door being worked on.
- R (3) Open both MLG inboard doors and install door actuator
R locks (Ref. 32-33-00).

EFFECTIVITY: 001-014 WITH SB52-046 AND 015-999

32-12-03
CONFIG-2
Page 501
May 15/85



MAINTENANCE MANUAL

- (4) If not previously done, at hinged door to strut linkage, disconnect clevises from door swing beam (Ref. Fig. 501).
- (5) Loosen both clevis rod-end jamnuts.
- (6) Remove wing access panel 641FB or 541FB, as applicable.

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (7) Turn on hydraulic system C pressure (Ref. 29-11-00).
- (8) Retract applicable gear (Ref. 32-32-00). Do not turn off hydraulic system C pressure.
- (9) Ensure that landing gear swing area is clear of equipment and personnel, and position LANDING GEAR control lever to NEUTRAL.
- (10) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (11) In flight station, tag NOSE & BYPASS, LEFT MAIN, and RIGHT MAIN LANDING GEAR UPLOCK MECHANICAL RELEASE T-handles to prevent inadvertent operation.
- (12) Allow approximately 15 minutes for MLG uplock snubber to fully compress due to weight of MLG. Verify full compression by measuring (Ref. Fig. 502).
- (13) Verify that MLG fixed strut door is correctly adjusted. If not, adjust as required (Ref. 32-11-02).
- (14) Loosen bolts securing hinges to wing structure so that bolts are approximately in center of hinge slot.
- (15) Door centering adjustment is not required.

NOTE: The uplock snubber may take more or less time than 15 minutes to fully compress. Proceed to Step (13) when dimension shown in Figure 502 is 2.125 (± 0.030) inches.

EFFECTIVITY: 001-014 WITH SB52-046 AND 015-999

32-12-03
CONFIG-2
Page 502
Jun 15/95

LOCKHEED
MAINTENANCE MANUAL

- (16) Close door by hand to check mismatch. Each inboard door corner should touch wing structure frame.
- (17) If inboard corners of door do not touch when hand closed, adjust hinges on serrated plates until required fit is obtained.
- (18) Door mismatch (door below wing contour) at outboard edge must not exceed 0.150 inch. Care must be exercised to prevent preloading door at forward and aft outboard edges.

CAUTION: BEFORE FORWARD HINGE BOLTS ARE TIGHTENED, VERIFICATION OF CLEARANCE BETWEEN THE HINGE AND DOOR MUST BE MADE (REF. FIG. 501).

- (19) Tighten all hinge bolts as follows (Ref. Fig. 501):

Forward Hinge MS21250-04028	95-100 lb in.
Forward Hinge MS21250-05028	185-190 lb in.
Aft Hinge MS21250-04024	95-100 lb in.
- (20) Open door fully and secure out of the way to prevent door damage when landing gear is extended.
- (21) Extend gear (Ref. 32-32-00).
- (22) If necessary, recycle gear to check door fit (Ref. 32-32-00).
- (23) Adjust forward clevis assembly to 8.25 inches (Ref. Fig. 501). Tighten jamnut sufficiently to remove any looseness between clevis and rod-end. Do not safety.
- (24) Attach forward clevis to door swing beam. Do not tighten bolt and nut.
- (25) Adjust aft clevis assembly so that swing beam-to-clevis attaching bolt can be installed easily. Remove bolt.
- (26) Secure aft clevis assembly to stowage bracket with tape so that clevis will not interfere with door when gear is retracted.
- (27) Retract applicable gear (Ref. 32-32-00). Verify that gear is resting on uplock snubber as called out in Step (12).

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EFFECTIVITY: 001-014 WITH SB52-046 AND 015-999

32-12-03
CONFIG-2
Page 503
Jun 15/95



MAINTENANCE MANUAL

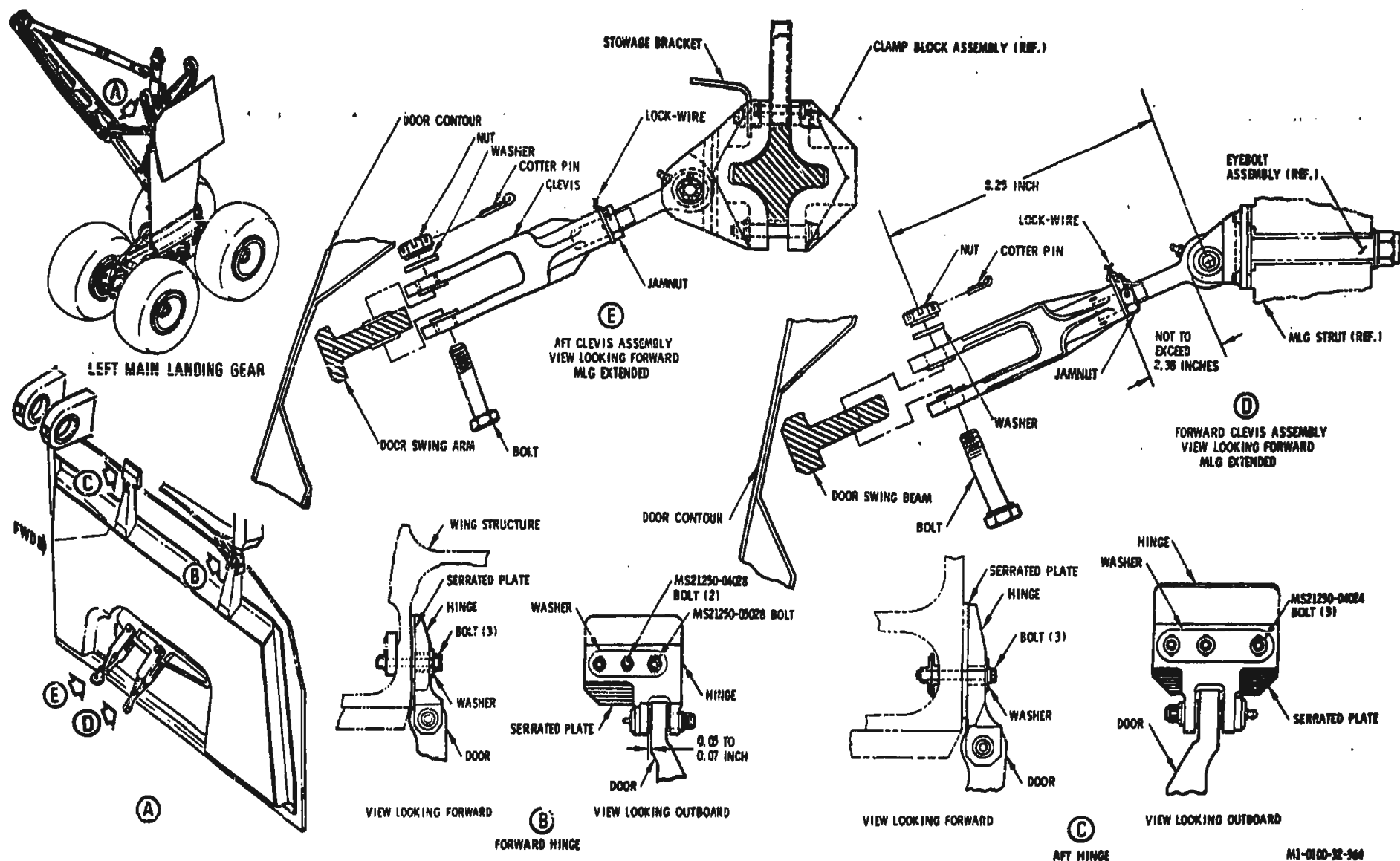
- (28) Measure gap between forward and aft inboard corners and door opening structure (Ref. Fig. 503). Convert average gap measured to turns required to close door.
 - (29) Extend gear (Ref. 32-32-00).
 - (30) Disconnect forward clevis from door swing beam.
 - (31) Turn rod-end to shorten forward clevis assembly the required number of turns determined in Step (24). Tighten jamnut and safety with lock-wire.
- NOTE:** One turn is one complete revolution of the rod-end or 360 degrees of rotation. The distance from the end of the clevis to the shoulder of the eye-bolt-head must not exceed 2.38 inches (Ref. Fig. 501).
- (32) Inspect clevis witness hole for sufficient thread engagement.
 - (33) Shorten aft clevis two turns less than forward clevis. This results in the aft clevis assembly being longer than the forward clevis assembly.
 - (34) Disconnect forward clevis from swing beam and attach aft clevis. Tighten nut and safety with cotter pin.
 - (35) Apply force inboard at forward lower corner of door until forward clevis can be attached to swing beam. A force of as much as 250 pounds may be required to align mating holes.
 - (36) Tighten nut and safety with cotter pin.
 - (37) Tighten aft clevis jamnut and safety with lock-wire.
 - (38) Retract gear (Ref. 32-32-00).
 - (39) Check for door smoothness (mismatch) (Ref. Fig. 503).
 - (40) On aircraft 015-031 with SB52-111 and 032-999, adjust the seals and plates installed along the hinged edge of the MLG hinged door to zero gap with the wing structure.
 - (41) Extend gear (Ref. 32-32-00).
 - (42) Install wing access panel previously removed.
 - (43) Perform completion procedure (Ref. 32-32-00).

R EFFECTIVITY: 001-014 WITH SB52-046 AND 015-999

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0018

32-12-03
 CONFIG-2
 Page 504
 Dec 15/92

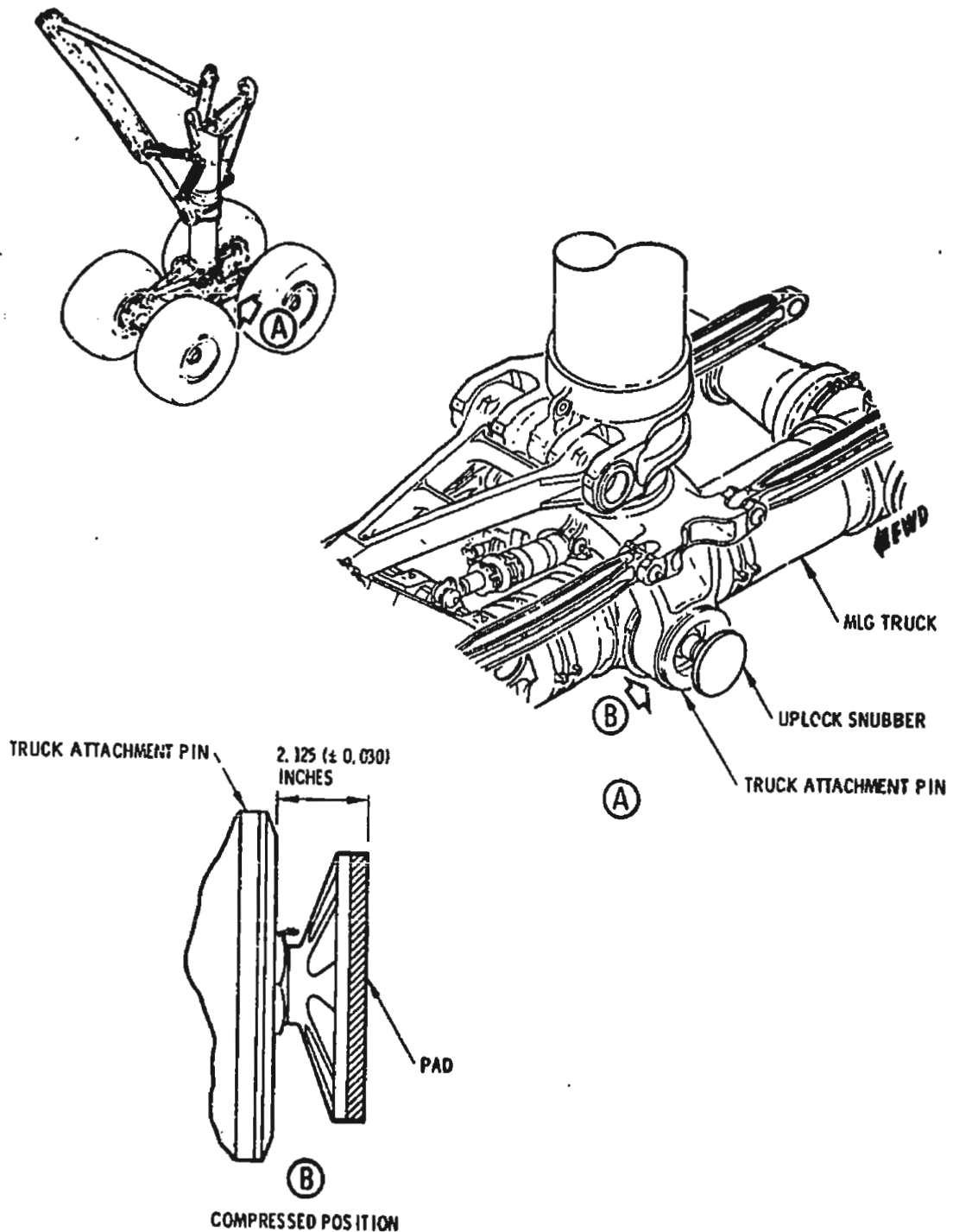


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Main Landing Gear Hinged Door - Adjustment and Test
Figure 501

32-12-03
CONFIG-2
Page 505/506
May 15/85

LOCKHEED
MAINTENANCE MANUAL



M1-0000-32-3005

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Main Landing Gear Uplock Snubber Compression Dimension
Figure 502

EFFECTIVITY: 001-014 WITH SB52-046 AND 015-999

001B

32-12-03
CONFIG-2
Page 507
Jun 15/95

LOCKHEED



MAINTENANCE MANUAL

- (44) Remove tags from NOSE & BYPASS, LEFT MAIN, and RIGHT MAIN LANDING GEAR UPLOCK MECHANICAL RELEASE T-handles.

R EFFECTIVITY: 001-014 WITH SB52-046 AND 015-999
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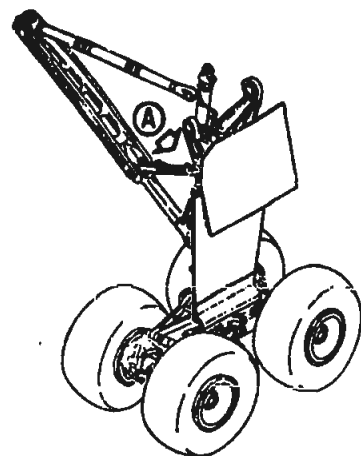
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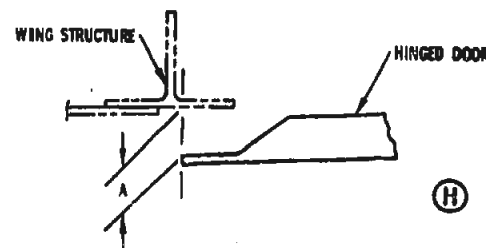
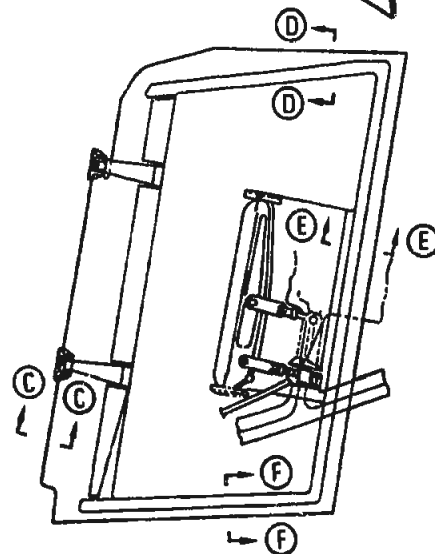
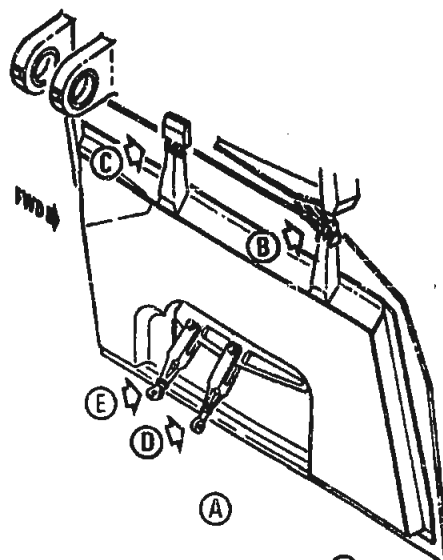
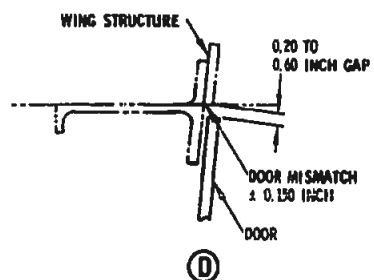
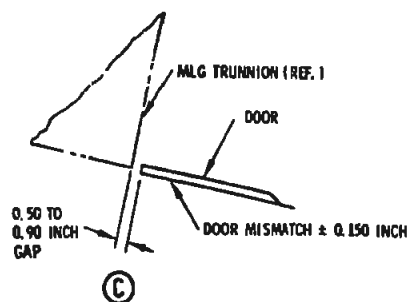
CONFIG-2

Page 508

Dec 15/92

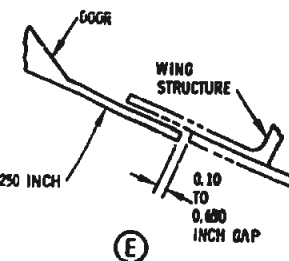
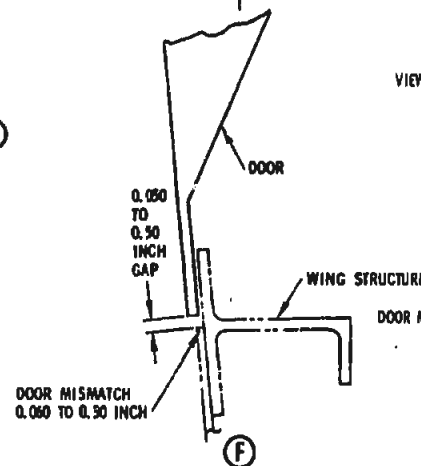
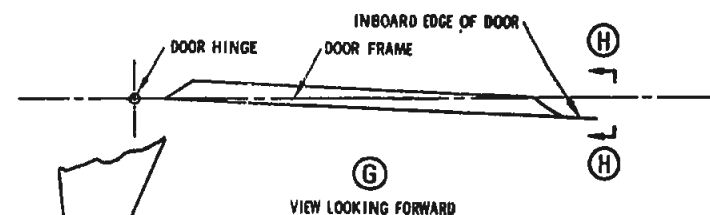


LEFT MAIN LANDING GEAR



DIMENSIONS IN INCHES

AVERAGE GAP A & B 2	0.00 TO 0.16	0.17 TO 0.24	0.25 TO 0.32	0.33 TO 0.40	0.41 TO 0.48	0.49 TO 0.56	0.57 TO 0.64	0.65 TO 0.72	0.73 TO 0.80	0.81 TO 0.88	0.89 TO 0.96	0.97 TO 1.04
TURNS TO CLOSE GAP		3 1/2	4	4 1/2	5	5 1/2	6	6 1/2	7	7 1/2	8	8 1/2

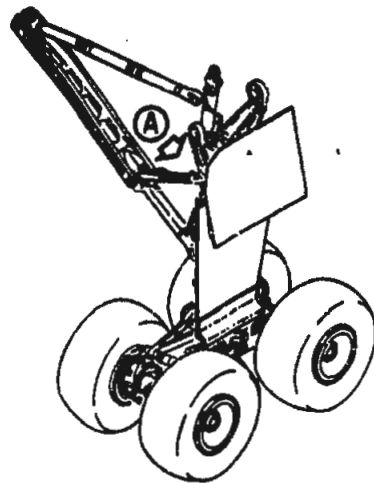


Main Landing Gear Hinged Door Fit
Figure 503

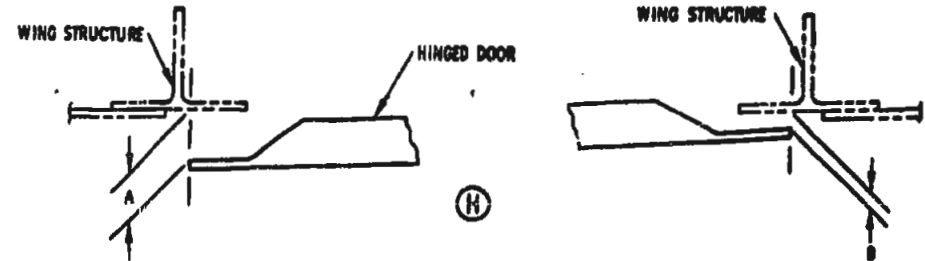
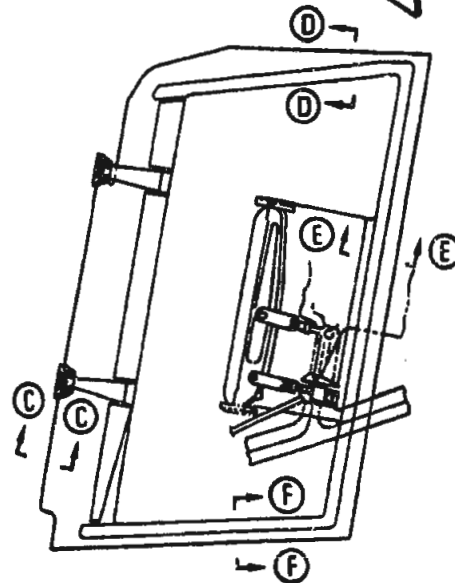
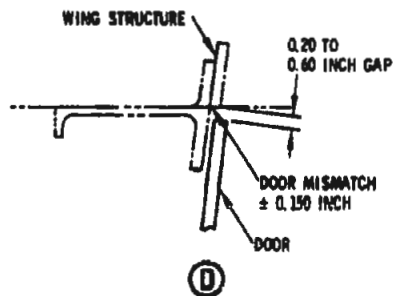
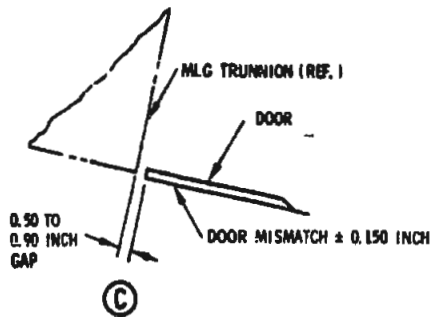
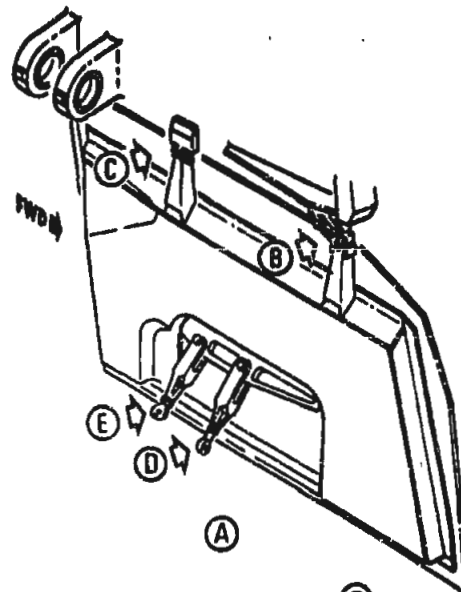
EFFECTIVITY: 001-014 WITH SB52-046 AND 015-999

32-12-03
CONFIG-2
Page 509/510
Dec 15/92

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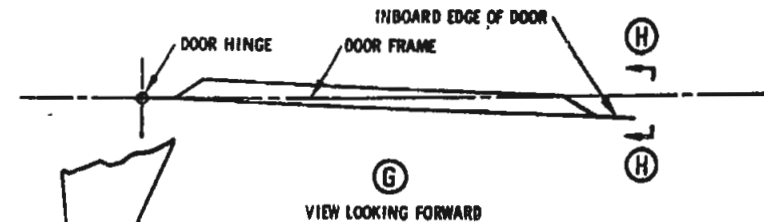


LEFT MAIN LANDING GEAR

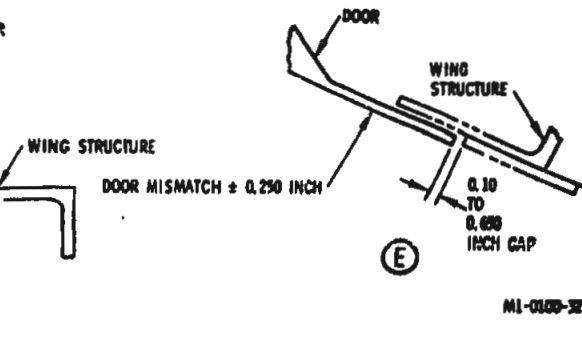
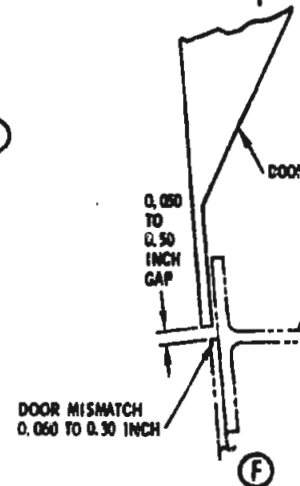


DIMENSIONS IN INCHES

AVERAGE GAP A & B 2	0.00 TO 0.16	0.17 TO 0.24	0.25 TO 0.32	0.33 TO 0.40	0.41 TO 0.48	0.49 TO 0.56	0.57 TO 0.64	0.65 TO 0.72	0.73 TO 0.80	0.81 TO 0.88	0.89 TO 0.96	0.97 TO 1.04
URNS TO CLOSE GAP		3 1/2	4	4 1/2	5	5 1/2	6	7 1/2	7	7 1/2	8	8 1/2



VIEW LOOKING FORWARD



ML-0100-32-505

Main Landing Gear Hinged Door Fit
Figure 503

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR HINGED DOOR - INSPECTION AND CHECK

1. General

This procedure applies to hinged doors which are tied to the main landing gear (MLG) strut by one door-to-strut link.

2. Inspection/Check

A. Metal Hinged Door

- (1) Inspect articulating hinge components for bent and broken parts and extreme wear.
- (2) Inspect door area around hinges and area around door structural members for cracks and loose rivets.
- (3) Inspect swing beam for bent or broken parts.
- (4) Check door for looseness.

B. Honeycomb Hinged Door

- (1) Inspect for delamination of skin layers, internal moisture or distortion as follows.
 - (a) Using a phenolic rod or edge of a coin, tap the suspected area with a steady rhythm. A solid sound indicates a good bonded structure; a hollow sound indicates delamination; and a dull, solid sound indicates moisture entrapment.
- (2) Inspect door area around hinges for cracks.
- (3) Inspect upper hinge half for broken attaching fasteners.
- (4) Check door for looseness in excess of normal clearance between parts. Excessive clearance can indicate worn or failed parts. Repair and replace parts as required.

NOTE: Refer to Structural Repair Manual for repair procedures.

EFFECTIVITY: ALL

0018

32-12-03
Page 601/602
Aug 15/78

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR INBOARD DOOR ROD ASSEMBLY
REMOVAL AND INSTALLATION

1. General

R This procedure contains instructions for removal and installation of the main landing gear (MLG) inboard door rod assembly. The rod assembly is secured between the inboard door and the door actuator link assembly by bolts at each end.

2. Equipment and Materials

Cotter Pin, MS24665-149, or equivalent
R Grease, Ref. MM 12-20-00, Lubrication, Scheduled Servicing
Lock-wire, QQ-W-390, Temp A, 0.040-inch diameter, or equivalent

3. Referenced Procedures

29-11-00 Hydraulic Power System - Maintenance Practices
32-10-00 Main Landing Gear Inboard Door - Maintenance Practices
32-12-01 Main Landing Gear Door - Adjustment and Test

4. Removal/Installation

A. Removal

- (1) Install right and left MLG and NLG downlock safety pins.
- (2) Ensure that flight station landing gear control lever is in DOWN position.
- (3) Pull D-handle to open MLG door and install MLG inboard door actuator lock (Ref. 32-10-00).
- (4) Disconnect phase control linkage from door. Secure up, out of the way of door when door is in closed position.
- (5) Remove antirotation retainer from lower rod bolt (Ref. Fig. 401).
- (6) Remove lockpin and then remove lower rod bolt.

EFFECTIVITY: ALL

001B

32-12-05
Page 401
May 15/85

LOCKHEED
MAINTENANCE MANUAL

- (7) Remove lockpin and then remove upper rod bolt.
- (8) Remove rod assembly.

B. Installation

- (1) Adjust rod ends of door rod to 0.38-inch thread engagement at each rod end.

NOTE: Door rod ends have left and right threads so that door rod may be turned for length adjustment.

MLG must be down and locked, MLG and NLG downlock safety pins must be installed, and door actuator must be extended and locked with MLG door actuator lock before installing door rod.

- (2) Position door rod upper end in actuator link assembly.

NOTE: Upper end of rod is identified by rod-end with left-hand thread; also body of door rod has nut holding end cap on the spring dust cover at the upper end.

After door rod installation, ensure that both rod end grease fittings are pointing down to permit servicing.

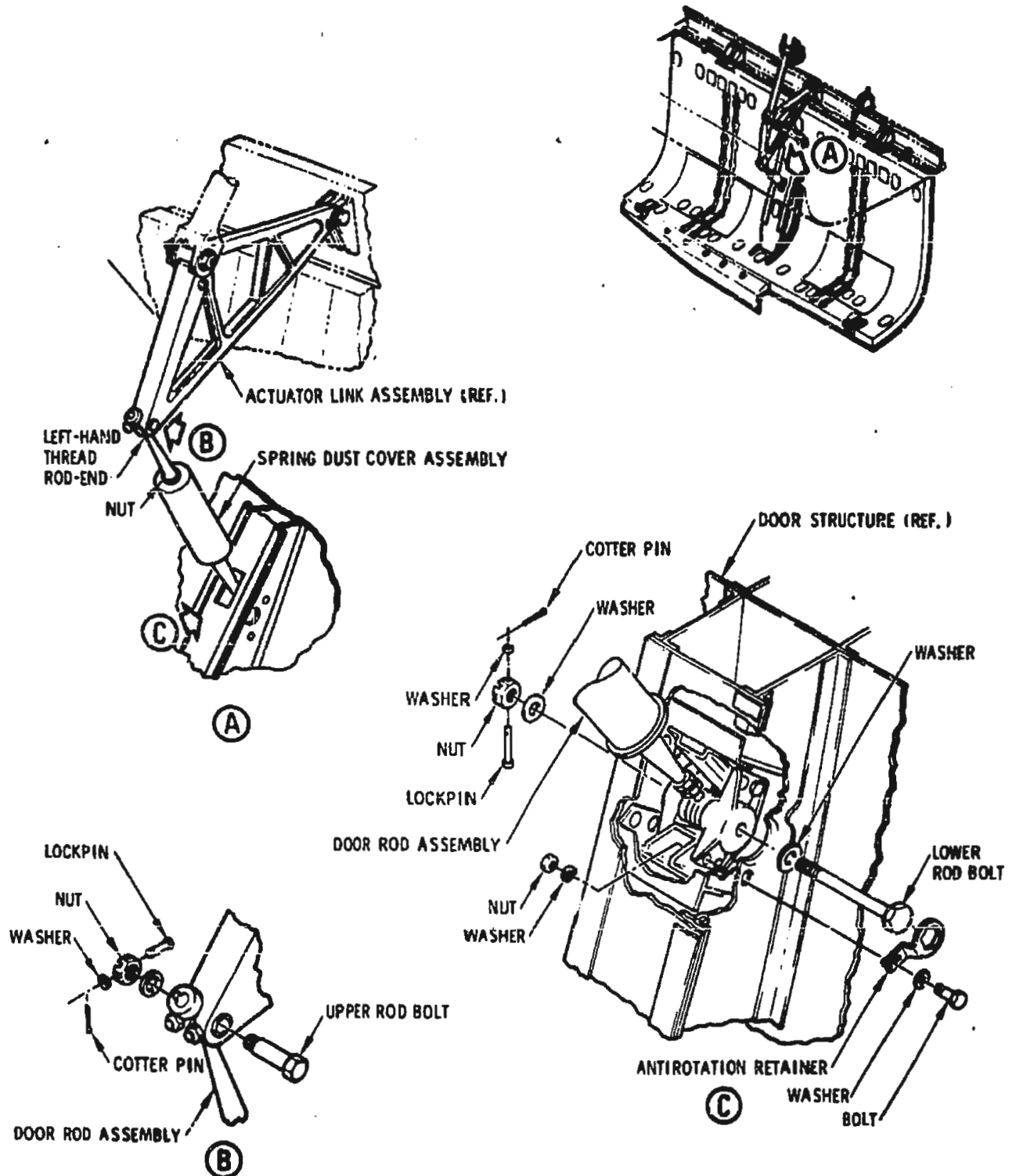
- (3) Install upper rod bolt, washer, nut, lockpin, and washer.
- (4) Safety lockpin with cotter pin.
- (5) Position door rod lower end in door.
- R (6) Coat lower rod bolt with grease.
- (7) Install lower rod bolt, washer, and nut.
- (8) Line up lockpin hole with nut in a torque range of 60 to 90 lb in.
- (9) Install lockpin and washer.
- (10) Safety lockpin with cotter pin.
- (11) Install antirotation retainer and secure with bolt and washer.
- R (12) Lubricate upper rod bolt, through grease fitting, with grease.

EFFECTIVITY: ALL

001B

32-12-05
Page 402
May 15/85

LOCKHEED
MAINTENANCE MANUAL



M1-0002-32-731

Main Landing Gear Door Rod - Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-12-05
Page 403
Mar 15/81

001B

LOCKHEED



MAINTENANCE MANUAL

- (13) Ensure that hydraulic system C pressure is zero psi.
 - (14) Remove MLG door actuator lock.
 - (15) Set hydraulic source flow rate to 3 gpm.
 - (16) Ensure that door area is clear of personnel and equipment, and then close door (Ref. 32-10-00).
 - (17) Turn door rod to shorten rod until door stops are contacted.
 - (18) On aircraft 001-031 without SB32-166, turn door rod further to shorten rod 0.58 inch (4.6 turns).
 - (18) On aircraft 001-031 with SB32-166 and 032-999, turn door rod further to shorten rod 1.07 inch (8.5 turns).
 - (19) Lock rod ends with nuts and safety with lock-wire.
 - (20) Connect phase control linkage to door.
- Adjust as required (Ref. 32-12-01).
- R (21) Turn off hydraulic system C pressure (Ref. 29-11-00).

EFFECTIVITY: ALL

001B

32-12-05
Page 404
May 15/85



MAIN LANDING GEAR INBOARD DOOR LINK ASSEMBLY
REMOVAL AND INSTALLATION

1. Equipment and Materials

Lock-wire QQ-W-390, 0.040-inch diameter, Inconel, condition A, or equivalent

Cotter Pin, MS24665-149, or equivalent

R Grease, Ref. MM 12-20-00, Lubrication, Scheduled Servicing

2. Referenced Procedures

29-11-00 Hydraulic Power System - Maintenance Practices

32-12-01 Main Landing Gear Inboard Door - Adjustment and Test

32-33-00 Main Landing Gear Inboard Door - Maintenance Practices

32-61-07 Main Landing Gear Inboard Door Uplock Sensor - Adjustment and Test

3. Removal/Installation

A. Removal

- (1) Verify that right and left MLG, and NLG downlock safety pins are installed.
- (2) Verify that flight station LANDING GEAR control lever is in DOWN position.
- (3) Open applicable MLG inboard door and install actuator lock (32-33-00).
- (4) Disconnect phase control linkage from door (Ref. Fig. 401, View A).
- (5) Disconnect door rod from actuator link (Ref. View B).
- (6) Disconnect actuator from actuator link (Ref. View C).
- (7) On aircraft 001-006 without SB32-048, disconnect MLG uplock sensor from link as follows (Ref. View D):

EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL

(a) Disconnect conduit support bracket from actuator link.

(b) Disconnect sensor mounting bracket from actuator link and secure up out of the work area.

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(7) On aircraft 001-006 with SB32-048 and 008-999, this step is not required.

(8) Support actuator link and disconnect from door surround structure fitting (Ref. View E).

B. Installation

NOTE: Prior to installation, each bearing and pin mating surface must be coated with a thin film of grease.

(1) Position upper end of actuator link in door surround structure fitting and install bolt, washer, and nut. Secure with lock-pin, washer, and cotter pin (Ref. Fig. 401, View E).

(2) Connect door actuator to actuator link, and secure pin with roller, lock washer, and bolt. Torque bolt to 155 to 205 lb in. and safety with lock-wire (Ref. View C).

(3) Position door rod upper end in actuator link. Install connecting pin, washer, and nut, and secure with lock pin, washer, and cotter pin (Ref. View B).

(4) Connect phase control linkage to door (Ref. View A).

(5) On aircraft 001-006 without SB32-048, connect MLG uplock sensor as follows (Ref. View D):

(a) Connect sensor and sensor mounting bracket to actuator link. Secure with bolts, washers, and nuts.

(b) Connect conduit support bracket to actuator link and secure with bolts, washers, and nuts.

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R

(5) On aircraft 001-006 with SB32-048 and 008-999, this step is not required.

(6) Ensure that hydraulic system C pressure is 0 psi.

(7) Set hydraulic source flow rate to 3 gpm.

(8) Close door (Ref. 32-33-00).

EFFECTIVITY: ALL

001B

32-12-07
Page 402
Aug 15/82

LOCKHEED



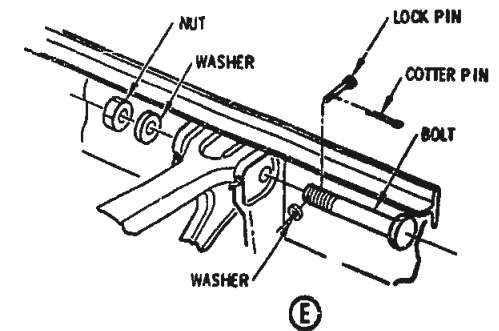
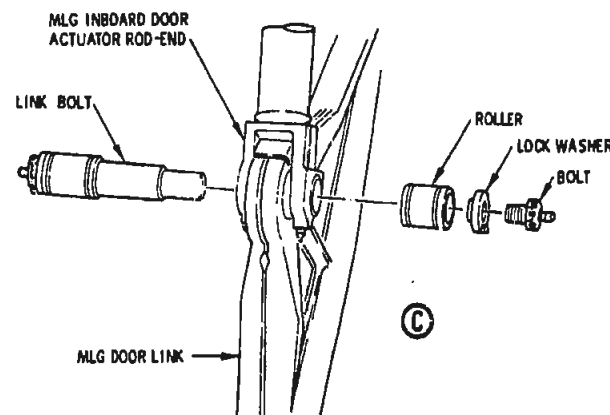
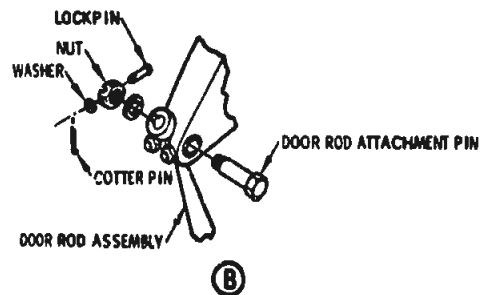
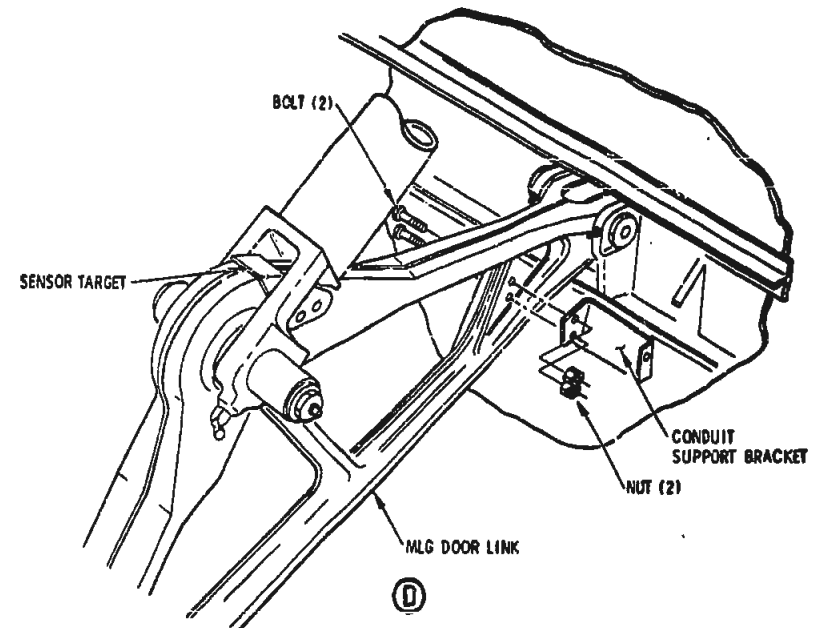
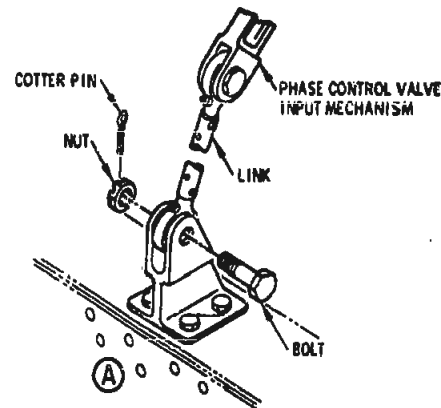
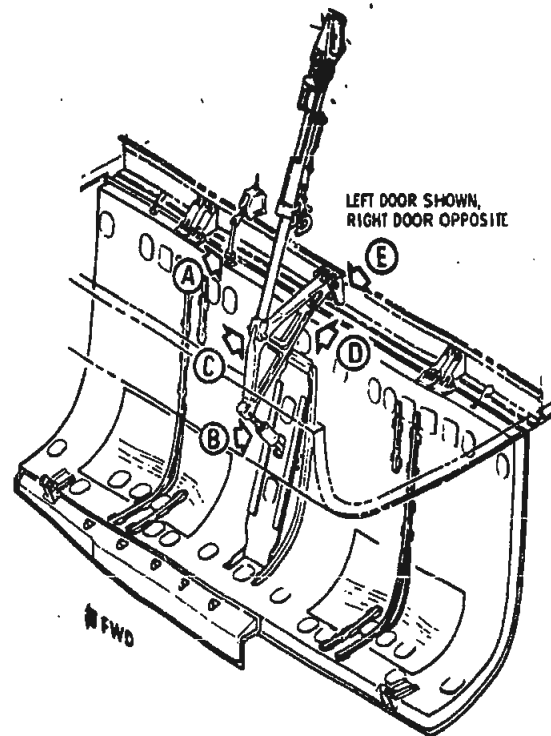
MAINTENANCE MANUAL

- (9) Check door for fit and alignment and adjust as required (Ref. 32-12-01).
- (10) Check door position indicating system and adjust sensor as required (Ref. 32-61-07).
- (11) Turn off hydraulic system C pressure (Ref. 29-11-00).

R EFFECTIVITY: ALL
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32-12-07
Page 403/404
Aug 15/82



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R Main Landing Gear Inboard Door Link - Removal and Installation
R Figure 401

EFFECTIVITY: ALL

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32-12-07
Page 405/406
May 15/85

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR INBOARD DOOR MANUAL OPENING SYSTEM
ADJUSTMENT AND TEST

1. Adjustment/Test

R For Adjustment and Test procedures for the Main Landing Gear
R Inboard Door Manual Opening System, refer to 32-37-00, 501,
Steps 4A(1) through 4A(30).

EFFECTIVITY: ALL

32-13-00
Page 501/502
May 15/73

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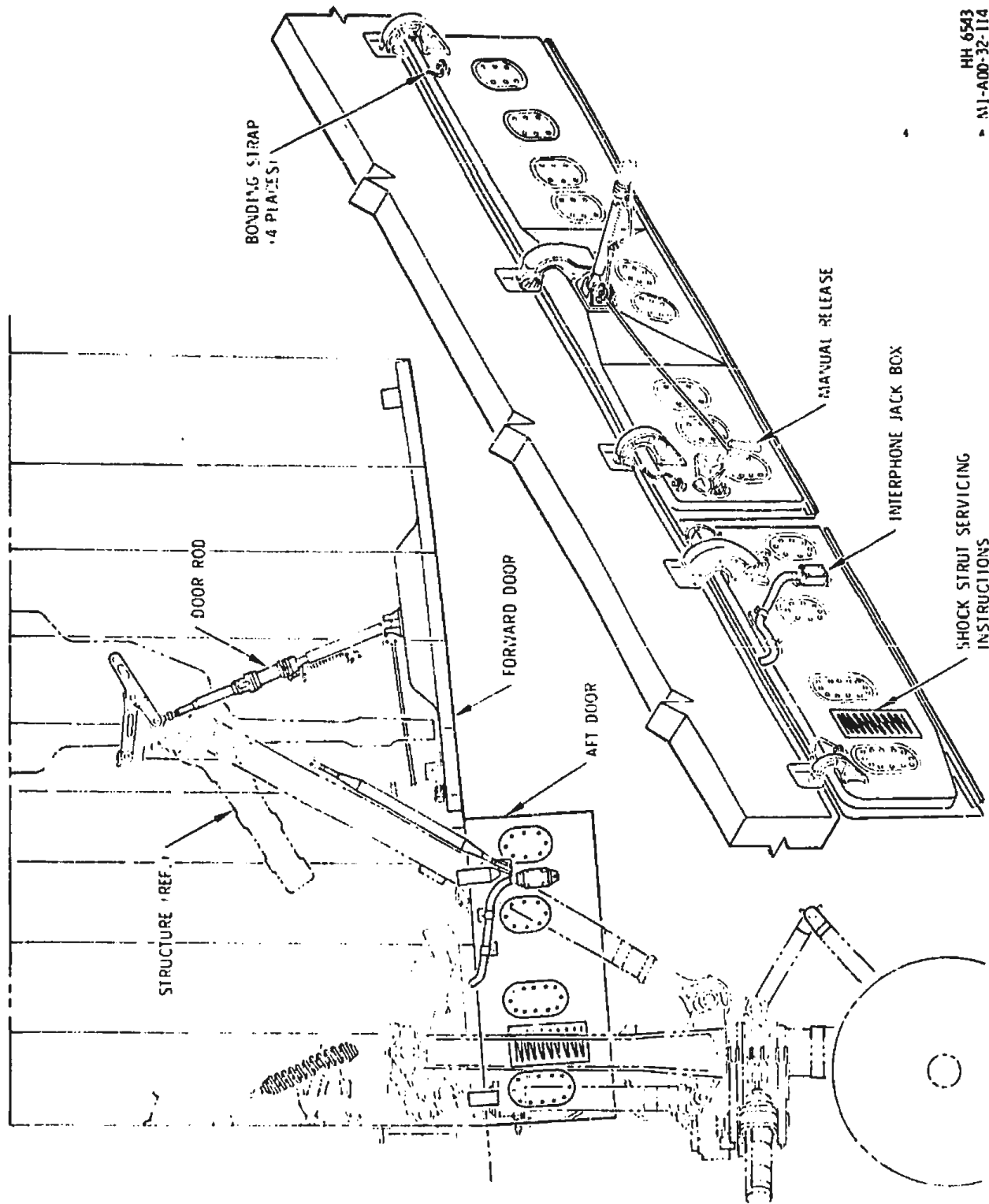
NOSE LANDING GEAR AND DOORS - DESCRIPTION AND OPERATION**1. General**

The nose landing gear, (NLG) is a major assembly that absorbs landing and taxi loads. The assembly, which includes the steering mechanism, provides controlled movement and supports the forward end of the fuselage while on the ground. The NLG is equipped with two wheel and tire assemblies that rotate independently. Extension, retraction, and steering of the NLG is performed with hydraulic power.

The NLG wheel well is equipped with two sets of doors that completely enclose the landing gear when it is retracted (Ref. Fig. 1). All doors are mechanically controlled and operate automatically by action of the NLG. Both sets of doors close when the gear retracts, but the aft set remains open when the nose gear is down. When ground service is required, each forward door can be opened by manual release.

LOCKHEED
MAINTENANCE MANUAL

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Nose Landing Gear Doors
Figure 1

EFFECTIVITY: ALL

32-20-00

Page 2
 Dec 1/71

LOCKHEED
MAINTENANCE MANUAL

R NOSE LANDING GEAR AND DOORS - FAULT ISOLATION

R 1. General

R Reference data and fault isolation procedures for
R troubleshooting landing gear system faults are included in this
R section of the manual. A landing gear system malfunction
R detected by the flight crew is normally entered in the aircraft
R flight log book and reported to maintenance personnel by a FIRM
R fault code number. This number and the flight log book write-up
R can be found in the Chapter 32 Fault Code Index. The index
R specifies the maintenance manual section, fault isolation
R diagram figure number and block number indicating the diagram
R entry point containing the fault isolation procedure.

R Prerequisites listed at the top of each diagram identify
R mandatory preliminary steps and circuit breakers that must be
R closed before initiating any fault isolation step.

R 2. Fault Isolation

R Table 101 is a list of fault isolation data in this section of
R the manual.

R Nose Landing Gear and Doors Fault Isolation
R Table 101

FIGURE	TITLE
101	Component Location Index
102	Nose Landing Gear Doors Location Diagram
103	Nose Landing Gear Doors Security Check

LOCKHEED
MAINTENANCE MANUAL

COMPONENT	QTY	AREA/ACCESS	REFERENCE
DOOR, NLG FORWARD	2	FWD OF NLG; 712A, 713A	32-22-01
DOOR, NLG AFT	2	AT NLG; 714A, 715A	32-22-02

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Component Location Index
Figure 101

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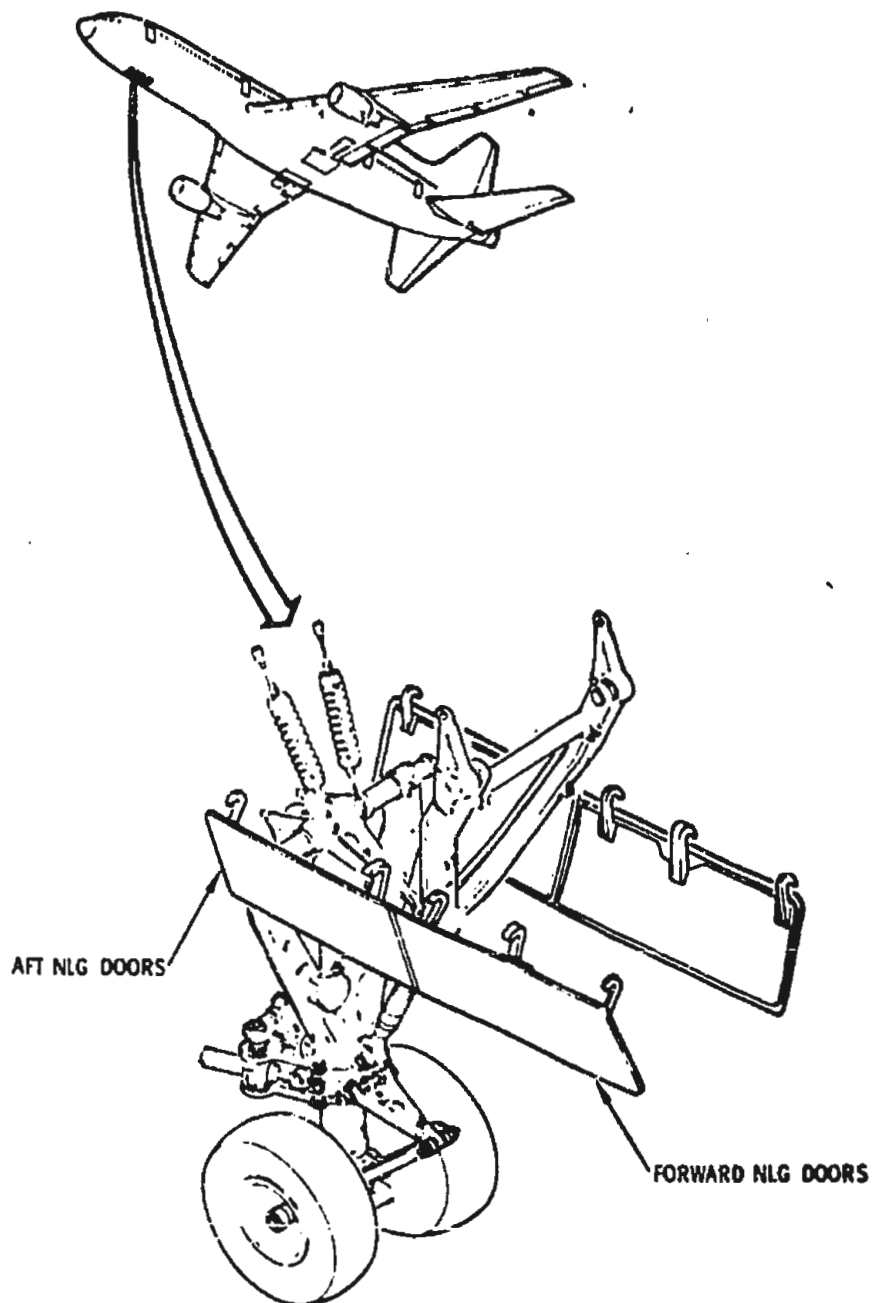
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32-20-00

Page 102

Nov 15/82

LOCKHEED
MAINTENANCE MANUAL



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Nose Landing Gear Doors Locator Diagram
Figure 102

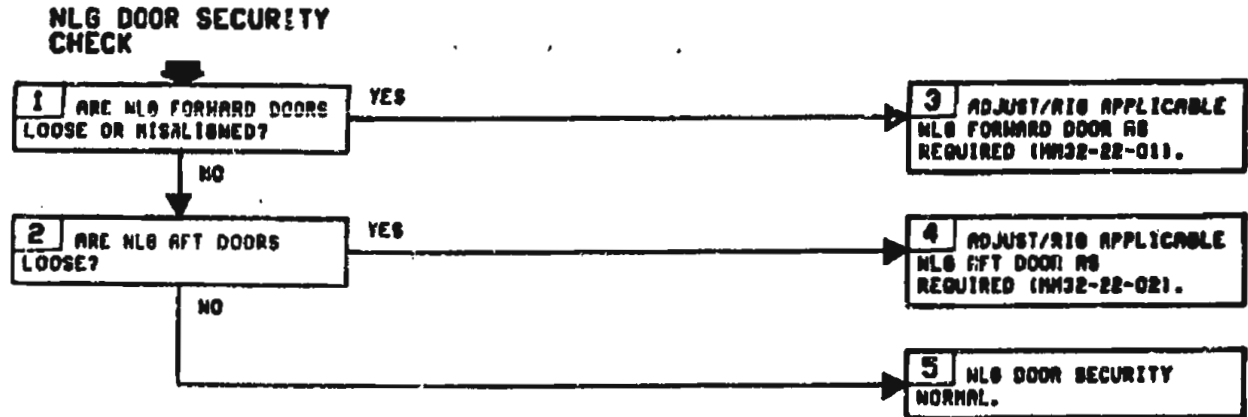
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EFFECTIVITY: ALL

32-20-00
Page 103
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL

PREREQUISITES
 NLG AND MLG DOWNLOCK SAFETY PINS INSTALLED (MM32-10-10)
 LANDING GEAR CONTROL LEVER DOWN AND TAGGED
 NLG FORWARD DOORS CLOSED



HL-0000-32-700

Nose Landing Gear Doors Security Check
Figure 103

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EFFECTIVITY: ALL

32-20-00
 Page 104
 Nov 15/82

**NOSE LANDING GEAR SYSTEM - DESCRIPTION AND OPERATION****1. General**

The nose landing gear (NLG) assembly consists of the following subassemblies (Ref. Fig. 1):

Shock strut assembly

Trunnion tube assembly

Upper and lower drag brace assemblies

Upper and lower torque arm assemblies

Upper and lower jury brace assemblies

Two jury brace springs

Retract actuator assembly (Ref. 32-34-00)

Two wheel and tire assemblies (Ref. 32-42-00)

Power steering valve assembly (Ref. 32-51-00)

Two steering actuators (Ref. 32-51-00)

Two steering system plate assemblies

Steering collar assembly

R Axle shield

R The NLG assembly is mounted to the structure by the trunnion tube assembly and the upper and lower drag brace assemblies. These assemblies are installed by trunnion pins to spherical bearings mounted in the nose wheelwell webs. Trunnion pins extend through the bearings and into the bore of the trunnion tube and through sockets in the upper drag brace. Crossbolts lock the trunnion tube assembly to the shock strut cylinder; the crossbolts also lock the upper drag brace to the upper drag brace trunnion pins. The trunnion tube also functions as a conduit for the steering system feedback control cables, and as the support for the upper end of the jury brace, the jury brace actuator crank, and the jury brace linkage stabilizer.

The upper drag brace is a modified, triangular component machined from a single-piece forging. The top of the drag brace has two socket bores for the drag brace trunnion pins. The drag brace includes an integral arm extending above each socket on

EFFECTIVITY: ALL

32-21-00

Page 1

Jul 15/84



each side to attach the forward door rod assemblies. Two sets of lugs on the underside of the upper drag brace provide attachment points for the aft door rods. The bottom end of the upper drag brace forms a clevis fork to attach the lower drag brace.

The lower drag brace is attached at the top to the upper drag brace by a pin. The lower drag brace is also attached at the bottom by a pin to lugs on the shock strut piston. The jury brace assembly is installed between the trunnion tube and the top of the lower drag brace. The jury brace assembly and the upper and lower drag brace assemblies work together to restrain the NLG in the down-and-locked position as well as in the up-and-locked position.

The fixed end of the retraction actuator is mounted to lugs on the back of the shock strut cylinder; the movable (piston) end is attached to the jury brace actuator crank. The downlock springs are mounted between a lug on the upper jury brace and the FS 446 bulkhead. Two forged and machined aluminum alloy steering plates are bolted to parallel annular flanges on the shock strut cylinder to support the steering mechanism (Ref. 32-50-00).

R The upper torque arm is mounted at the top to lugs on the steering collar and at the bottom to the lower torque arm. The lower torque arm is mounted at the bottom to the shock strut piston and at the top to the upper torque arm. The torque arms transmit steering forces from the steering mechanism to the wheels. A disconnect pin, at the apex, is provided to permit disconnecting the upper torque arm from the lower torque arm when towing the aircraft. The upper torque arm can be raised upward to a spring-loaded detent which holds the arm in a raised position.

R Hydraulic power for retraction, extension, and steering is distributed down the strut by plumbing that is manifolded and supported by brackets. Electrical wiring is routed through protective conduits. To provide protection from rock and debris damage, the axle shield is installed at the base of the shock strut piston. The shield is made of press-formed aluminum alloy.

2. Operation

R The NLG operates simultaneously with the main landing gear during extension or retraction cycles when the control switch lever is moved by either pilot. When the landing gear control is placed in the UP position, the landing gear selector valve directs system C hydraulic pressure to the NLG uplock and the retract actuators. Hydraulic pressure directed to the piston

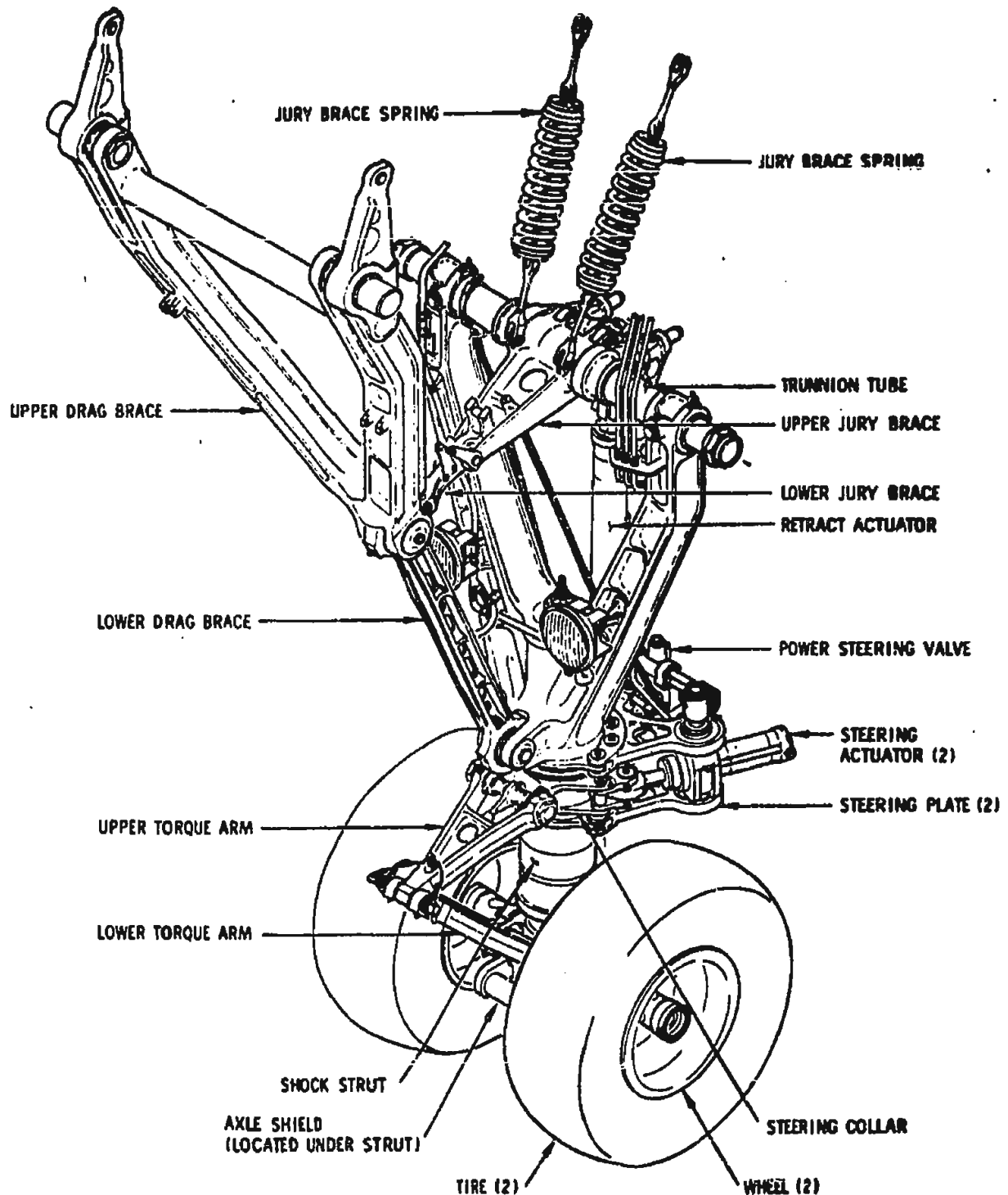
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32-21-00

Page 2

JUL 15/84

LOCKHEED
MAINTENANCE MANUAL



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Nose Landing Gear Subassemblies
Figure 1

EFFECTIVITY: ALL

32-21-00
Page 3
Feb 15/74

001B

LOCKHEED
MAINTENANCE MANUAL

end (bottom) of the retract actuator extends the piston which provides the force to rotate the jury brace. This action causes the jury brace to fold in the center and rotate downward. Folding of the jury brace results in center folding of the upper and lower drag brace assemblies, and allows the landing gear to swing forward. Continued extension of the retract actuator forces the landing gear all the way up into the wheel well to engage the uplock.

R Hydraulic pressure applied to the rod end of the uplock actuator supplies force to retract the uplock actuator piston to permit the latch to rotate to the locked position. Both sets of doors are pulled closed behind the shock strut by the rods which attach the doors to the upper drag brace.

During the gear-down cycle, system C hydraulic pressure is applied simultaneously to the NLG uplock and retract actuators. This action releases the uplock and extends the gear in the following sequence:

The uplock releases and the landing gear starts to move downward. Mechanical linkage between the doors and the landing gear pushes the doors open ahead of the landing gear.

Pressure applied to the top (rod) end of the retract actuator applies the force to continue landing gear movement to the down-and-locked position. During the last part of landing gear travel, the door linkage reverses travel of the forward doors to close them. The aft nose doors remain open. The landing gear continues to travel to the down-and-locked position.

3. Nose Landing Gear Shock Strut Assembly

A. Description

The NLG shock strut (Ref. Fig. 2) is the primary support member for the fuselage nose. The NLG shock strut is a conventional air/nitrogen and oil-type strut with internal centering cams. The strut provides support for the steering mechanism. During the last few inches of strut piston extension, the centering cam ensures that the wheels are aligned fore and aft before gear retraction or for landing. Major components of the NLG shock strut assembly are the cylinder assembly and the piston assembly.

The cylinder assembly contains the following parts:

Cylinder

EFFECTIVITY: ALL

001B

32-21-00
Page 4
Jul 15/84

**Orifice tube****Orifice****Orifice tube retaining nut****Air charging valve**

The cylinder is a single-piece, forged and machined, heavy-walled steel tube with large integral trunnion arms for attachment to the trunnion tube. Integral lugs are provided to attach the drag brace and the retract actuator. Two parallel flanges are machined into the cylinder exterior to attach the steering plate assemblies that support the steering actuators.

R

The orifice tube is machined from an aluminum alloy forging. The orifice tube extends through a flanged retainer ring and the top of the cylinder assembly. The orifice tube is locked to the cylinder by a large retaining nut. The flanged retainer ring bears against an O-ring packing to seal the top of the cylinder and orifice tube assembly from air and oil leaks. The top of the orifice tube, which is fitted with a threaded insert, contains the air charging valve.

R

R

The piston assembly is a one-piece, forged and machined steel tube with integral axles. Integral lugs provide for attachment of the lower torque arm and the ground towing bar. Upper and lower bearing assemblies, which function as sealing devices and guides, locate the piston tube concentric with the cylinder and the orifice tube. The upper cam assembly and upper bearing are locked to the pistons by lockpins and retainer rings. The upper cam has an annular groove to install a rebound snubber ring.

R

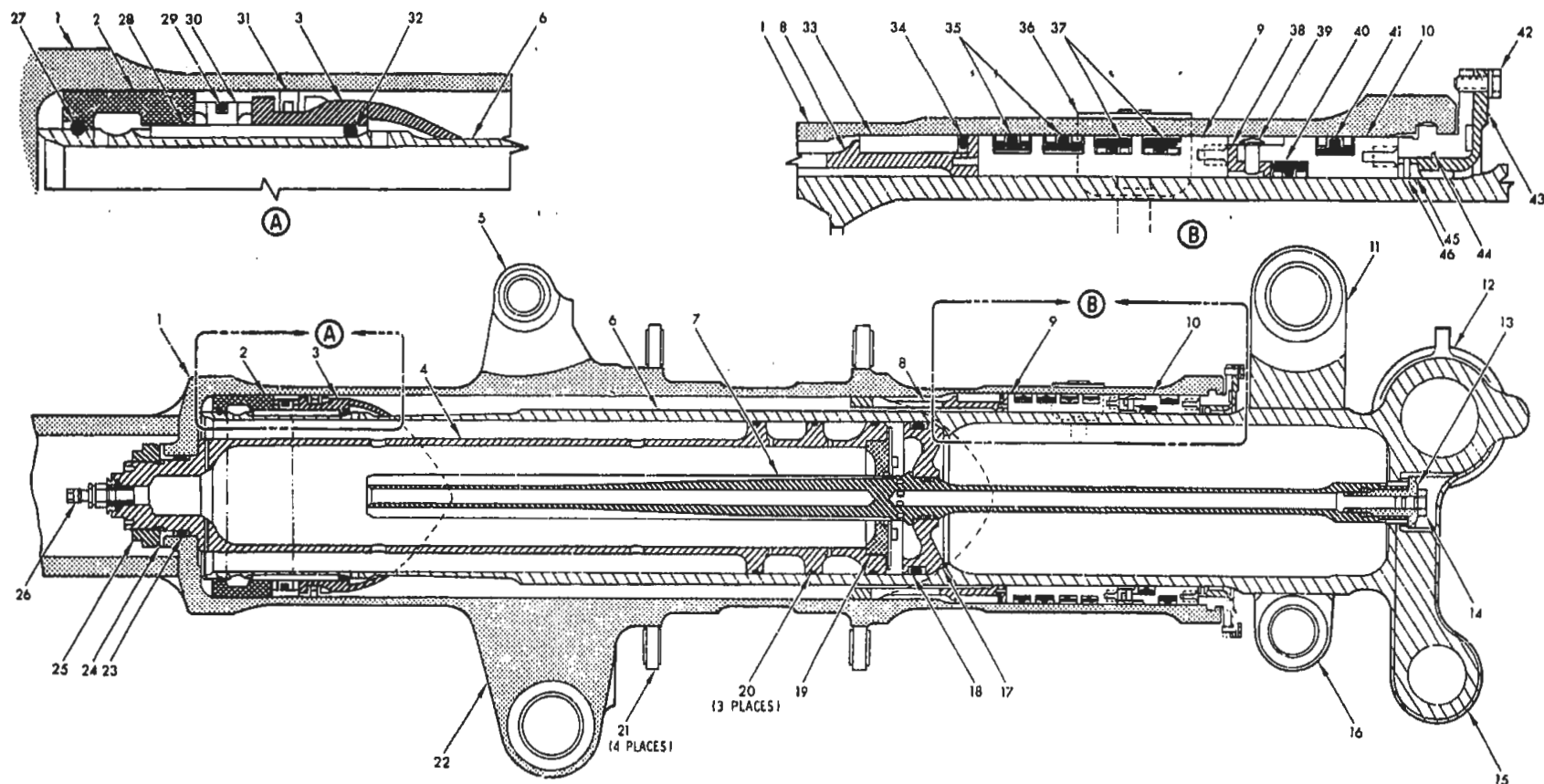
The lower bearing assembly includes two sets of spare strut seals in annular grooves. A diaphragm with an annular groove and a packing seal are installed against an internal flange in the piston bore. This diaphragm seals off the bore to reduce the total fluid volume required. A hollow tubular metering pin, fluted along its upper half, extends down through the diaphragm and the piston bottom to function as a drain tube. The metering pin has an annular groove and packing seal at the top seated against the diaphragm. A threaded insert extends up through the piston bottom and into the metering pin bore to lock the metering pin, the diaphragm, and the piston tube together. A removable plug is provided to close the bottom of the metering pin and to serve as a drain plug.

EFFECTIVITY: ALL

001B

32-21-00

Page 5/6
Jul 15/84



- | | | | | | | | |
|------------------------|-----------------------|-----------------------|------------------------|-------------------|-------------------|-----------------|-------------------|
| 1 CYLINDER | 7 METERING PIN | 13 INSERT | 19 ORIFICE | 25 NUT | 31 RING | 37 SPARE SEALS | 43 RETAINING RING |
| 2 UPPER BEARING | 8 LOWER CAM | 14 PLUG | 20 RING | 26 CHARGING VALVE | 32 RETAINER RING | 38 SPACER | 44 SPLIT RETAINER |
| 3 UPPER CAM | 9 BEARING | 15 TOW BAR ATTACHMENT | 21 STEERING PLATE LUG | 27 RETAINER RING | 33 PIN | 39 PIN | 45 SCRAPER |
| 4 ORIFICE TUBE | 10 ADAPTER | 16 TORQUE ARM LUG | 22 LOWER DRAG LINK LUG | 28 LOCK PIN | 34 RING | 40 DYNAMIC SEAL | 46 RETAINER |
| 5 RETRACT ACTUATOR LUG | 11 TOW BAR ATTACHMENT | 17 DIAPHRAGM | 23 PACKING | 29 GASKET | 35 SPARE SEALS | 41 STATIC SEAL | |
| 6 PISTON | 12 AXLE | 18 PACKING | 24 RETAINER | 30 SPACER | 36 IDENTITY PLATE | 42 BOLT | |

MI-0101-32-113

Nose Landing Gear Shock Strut
Figure 2

EFFECTIVITY: ALL

32-21-00
Page 7/8
Feb 15/74

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MAINTENANCE MANUAL

NOSE LANDING GEAR ASSEMBLY - REMOVAL AND INSTALLATION

1. General

R The NLG assembly is comprised of components listed below. For
R detailed procedures concerning removal and installation of a
R particular component, refer to the following sections:

R 32-21-02 Nose Landing Gear Shock Strut Assembly - Removal
R and Installation

R 32-21-03 Nose Landing Gear Upper Drag Brace - Removal and
R Installation

R EFFECTIVITY: ALL
R

001B

32-21-01
Page 401/402
Nov 15/82

**NOSE LANDING GEAR SHOCK STRUT ASSEMBLY - REMOVAL AND INSTALLATION****1. General**

This procedure covers removal and installation of the nose landing gear by use of bootstrap equipment to maneuver the nose gear, and an ordinary dolly for transporting the nose gear.

2. Equipment and Materials

Bungee Spring Tool Assembly, PN B698, or equivalent

Corrosion Preventive Compound, MIL-C-23411, Grade 3, or equivalent

Flashlight

R Grease, Ref. MM 12-20-00, Lubrication, Scheduled Servicing

Inspection Mirror

Nose Landing Gear Bootstrap Hoist Assembly, PN BG27, or equivalent

Tugit Hoist, Model R237, 1-1/2 ton capacity, or equivalent

Adjustable Height Maintenance Stand, or equivalent

Four-wheel swivel dolly, 4000-lb capacity

Nose Landing Gear Control Cable Tool Set, PN B977, or equivalent

Nose Landing Gear Drag Brace Center Pin Tool Set, PN B965, or equivalent

Nose Landing Gear Piston Support Assembly, PN B708-101, or equivalent

Nose Landing Gear Trunnion Pin Replacement Tool Set, PN B962, or equivalent

Low Adhesion Sealing Compound, LAC Spec C-40-769, Type II (Products Research Co., PR 1301BT-K and Coast Proseal and Mfg. Co., No. 713), or equivalent

Lock-wire, Fed Spec QQ-W-390, 0.032-inch diameter, or equivalent

Cotter pin, MS24665-153, or equivalent

EFFECTIVITY: ALL

001B

32-21-02
Page 401
Dec 15/93

LOCKHEED
MAINTENANCE MANUAL

Cotter pins, MS24665-302, or equivalent

3. Referenced Procedures

7-11-00	Wing and Fuselage Jacking - Maintenance Practices
10-10-00	Normal Towing Conditions - Maintenance Practices
12-14-13	Nose Landing Gear Strut - Servicing
12-24-00	Lubrication
20-51-04	Environmental Sealing of Model L-1011 Airplane (PB75-425)
24-00-00	Electrical Power - Maintenance Practices
29-11-00	Hydraulic Power System - Maintenance Practices
32-30-00	Landing Gear Retraction and Extension - Adjustment and Test
32-51-00	Nose Gear Steering System - Adjustment and Test

4. Removal/Installation

A. Preliminary Procedures

- (1) Clear area around aircraft to allow jacking from forward fuselage jack point only.
- (2) Install wheel chocks and chain binders forward and aft of main landing gear wheels.
- (3) Install downlock safety pins in all three landing gears (Ref. 10-10-00).
- (4) Verify landing gear control lever is in DOWN position. Tag lever.
- (5) On aircraft 001-006,
open nose landing gear (NLG) forward doors by pulling manual release at aft end of each door.
- (5) On aircraft 007-999,
open nose landing gear (NLG) forward doors by pulling manual release at aft end of left door and removing door rod to door disconnect pin on right door.

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EFFECTIVITY: ALL

32-21-02
Page 402
Jun 15/92



MAINTENANCE MANUAL

- (6) At filler valve (top of shock strut cylinder) release air or nitrogen charge from shock strut by removing dust cap on charging valve and turning upper nut on valve assembly three to four turns counterclockwise. Remove valve.
- (7) Install NLG piston support assembly (Ref. Fig. 401). Adjust turnbuckle to remove any slack in installation.
- (8) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (9) Turn on electrical power (Ref. 24-00-00).
- (10) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, ensure that circuit breakers PARKING BRAKE NO. 1 (G18), PARKING BRAKE NO. 2 (G22), and BRAKE PRESS IND (G21) are closed.
- (11) On pilots center instrument panel, zone 210, place BRAKE SYS SELECT switch in ALT SYS C position.
- (12) Depress and release brake pedals until system C brake pressure is 0 psi. Depressurize system C reservoir.
- (13) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag following circuit breakers:
 - WEIGHT & BAL - AC and DC (F5, F6)
 - NOSE GEAR LT - CONT, LAND, and TAXI (G6, G7, G8)
 - MLG GND SENSE (I.8)
- (14) On Flight Engineer/Second Officers aft circuit breaker panel CB3, zone 215, open and tag circuit breaker PROXIMITY SWITCH 3 (H4).
- (15) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breakers PROX SW PWR NO. 1 (L10), DOOR POS IND (L13), and RAT MAN DEPLOY (B14).
- (16) Remove rod-to-door attaching bolts from left and right aft doors (Ref. Fig. 402). Secure rods to upper drag brace.
- (17) Remove rod-to-door attaching bolts from left and right forward doors.

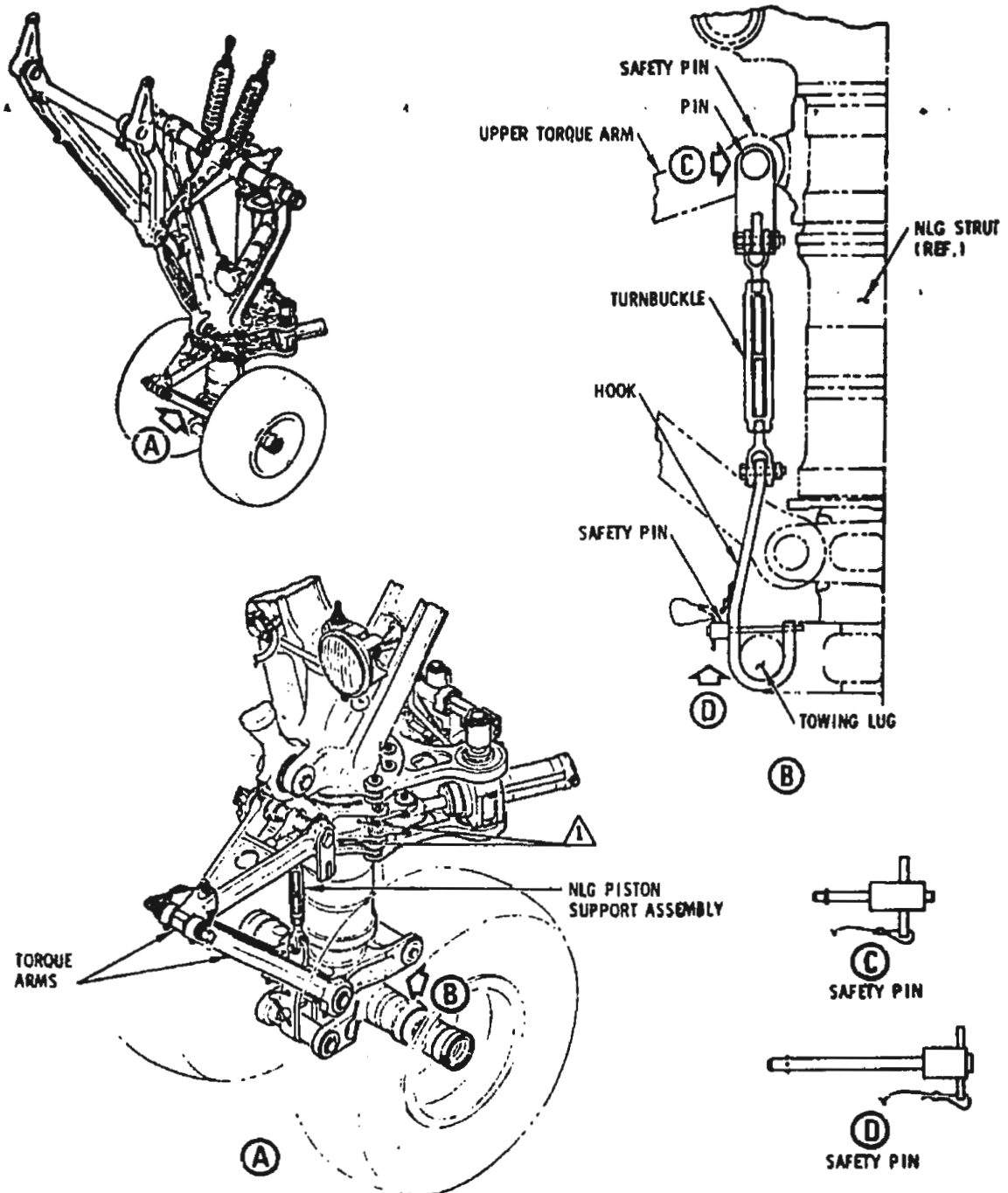
WARNING: STRUT PRESSURE MUST BE 0 PSI AND VALVE MUST BE REMOVED BEFORE JACKING AIRCRAFT.

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32-21-02

Page 403
Jun 15/92

LOCKHEED
MAINTENANCE MANUAL



NOTE
⚠ ENSURE 45 DEGREE LUBE FITTINGS ARE INSTALLED.
(LEFT AND RIGHT SIDES OF SHOCK STRUT)

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Nose Landing Gear Piston Support Assembly
Figure 401

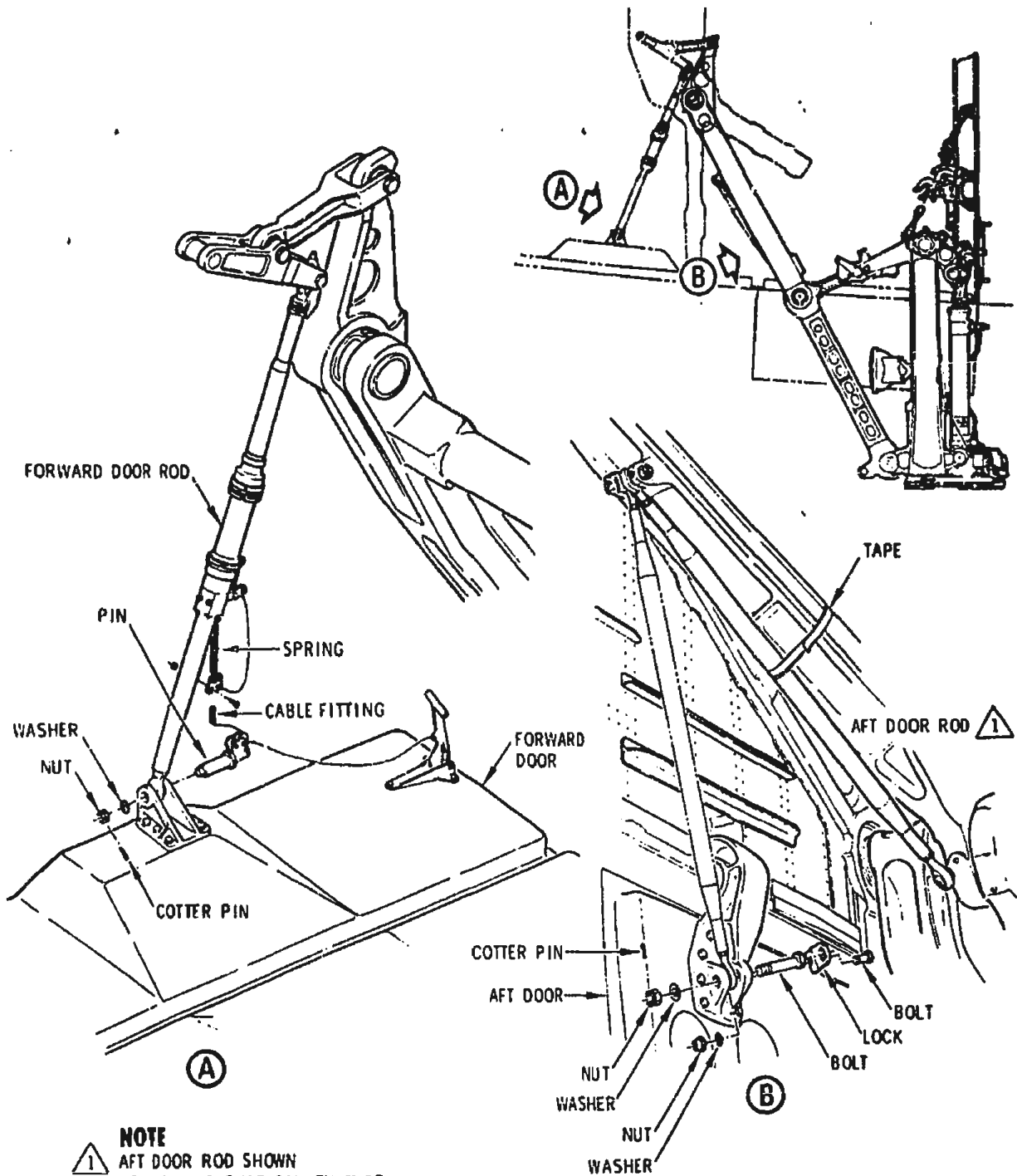
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001B

32-21-02
Page 404
Aug 15/82

LOCKHEED
MAINTENANCE MANUAL



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Nose Landing Gear Forward and Aft Doors Linkage Disconnect
Figure 402

EFFECTIVITY: ALL

32-21-02
Page 405
Nov 15/75

001B

LOCKHEED
MAINTENANCE MANUAL

- (18) Jack aircraft until nose wheel is high enough to clear cart (Ref. 7-11-00).
 - (19) Disconnect electrical connectors in junction box at rear of nosewheel well, FS 449 bulkhead. Cap open receptacles (Ref. Fig. 403).
 - (20) Disconnect hydraulic hoses at the support bracket. Cap open hoses and bulkhead fittings.
 - (21) Install bungee tool assembly, and remove bolts attaching springs to upper jury brace assembly. Secure springs (up) out of work area (Ref. Fig. 404).
 - (22) Using NLG drag brace center pin tool set, disconnect upper drag brace from lower drag brace. Secure upper drag brace out of work area. Pad and secure lower drag brace to prevent damage to gear and drag brace (Ref. Fig. 405).
 - (23) Open left and right environmental control system (ECS) doors 117AL and 118CR.
 - (24) Remove duct sections in the ECS compartments, as required, to gain access to the NLG trunnion pins.
 - (25) In the left ECS compartment, disconnect two steering cables at turnbuckles; remove both cable guide pins, and trunnion pulley bracket (Ref. Fig. 406).
- NOTE: To simplify reinstallation, secure upper ends of disconnected cables with sufficient tension to prevent fouling in other parts of system when cables are slack.
- (26) Pull steering cables into trunnion tube, using NLG control cable tool set.

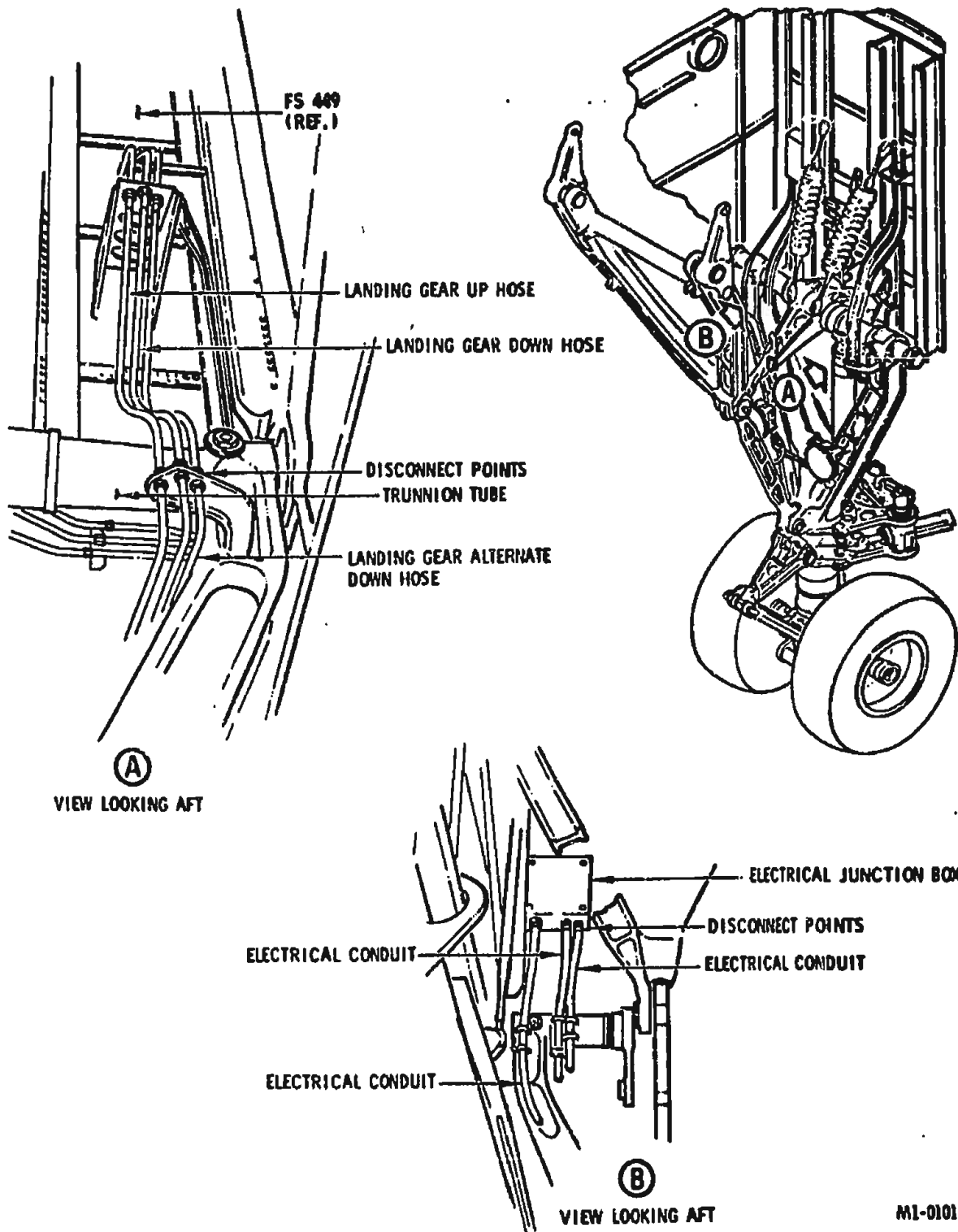
B. Removal (Using Bootstrap Equipment)

- (1) Install hoist fixture as follows (Ref. Fig. 411):
 - (a) Position two plates on each web and secure with bolts so that top bolts are approximately 15 inches from overhead panel.
 - (b) Position hoist fixture so that upper tube is between plates and lower tube rests on web face.
 - (c) Position upper tube into hole in plate on one side, then extend tube insert into hole in plate on other side.

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32-21-02
Page 406
Jun 15/92

LOCKHEED
MAINTENANCE MANUAL



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Nose Landing Gear Hydraulic Line and Electrical Conduit
Disconnect Points
Figure 403

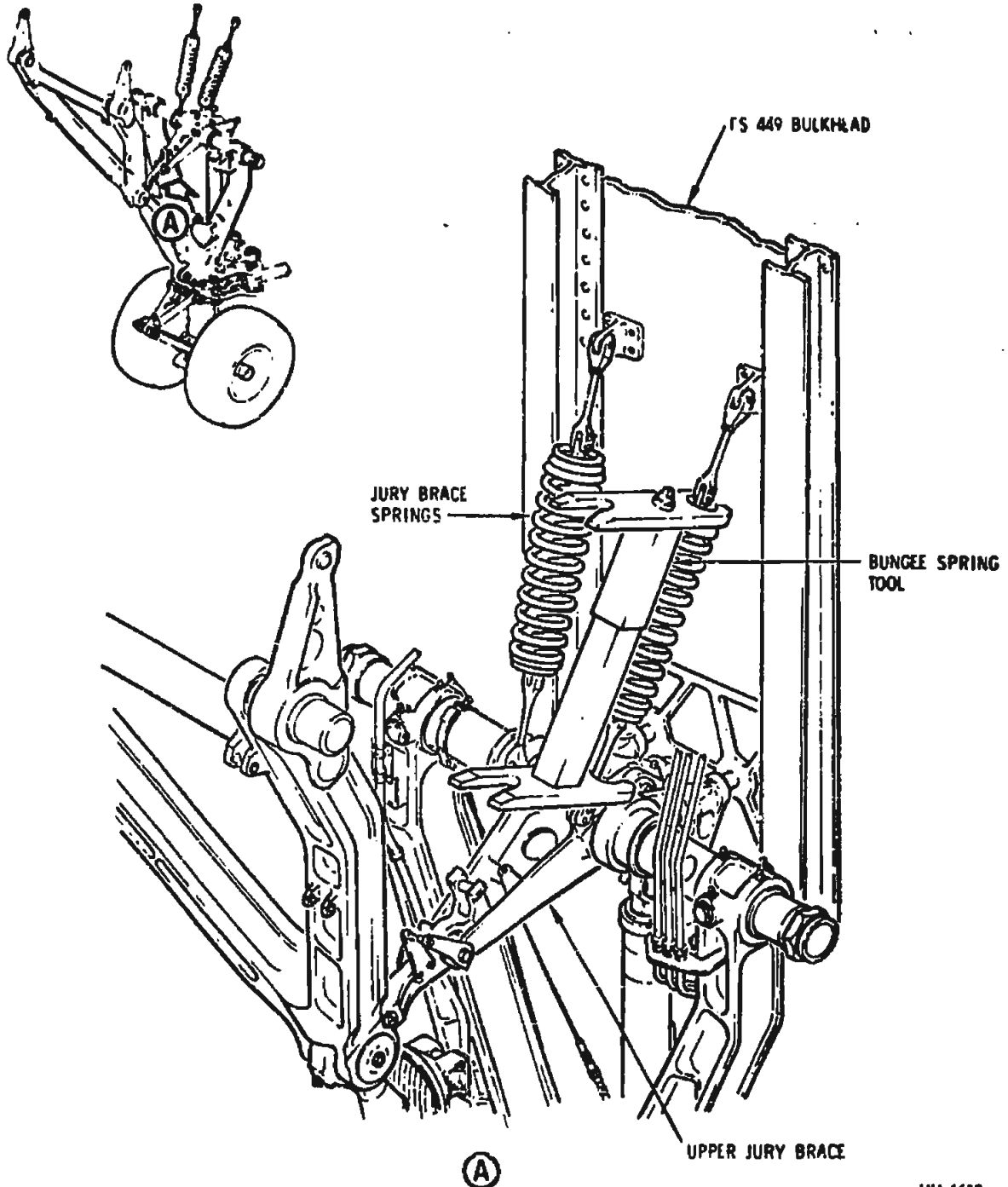
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Page 407
Nov 15/75

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LOCKHEED
MAINTENANCE MANUAL



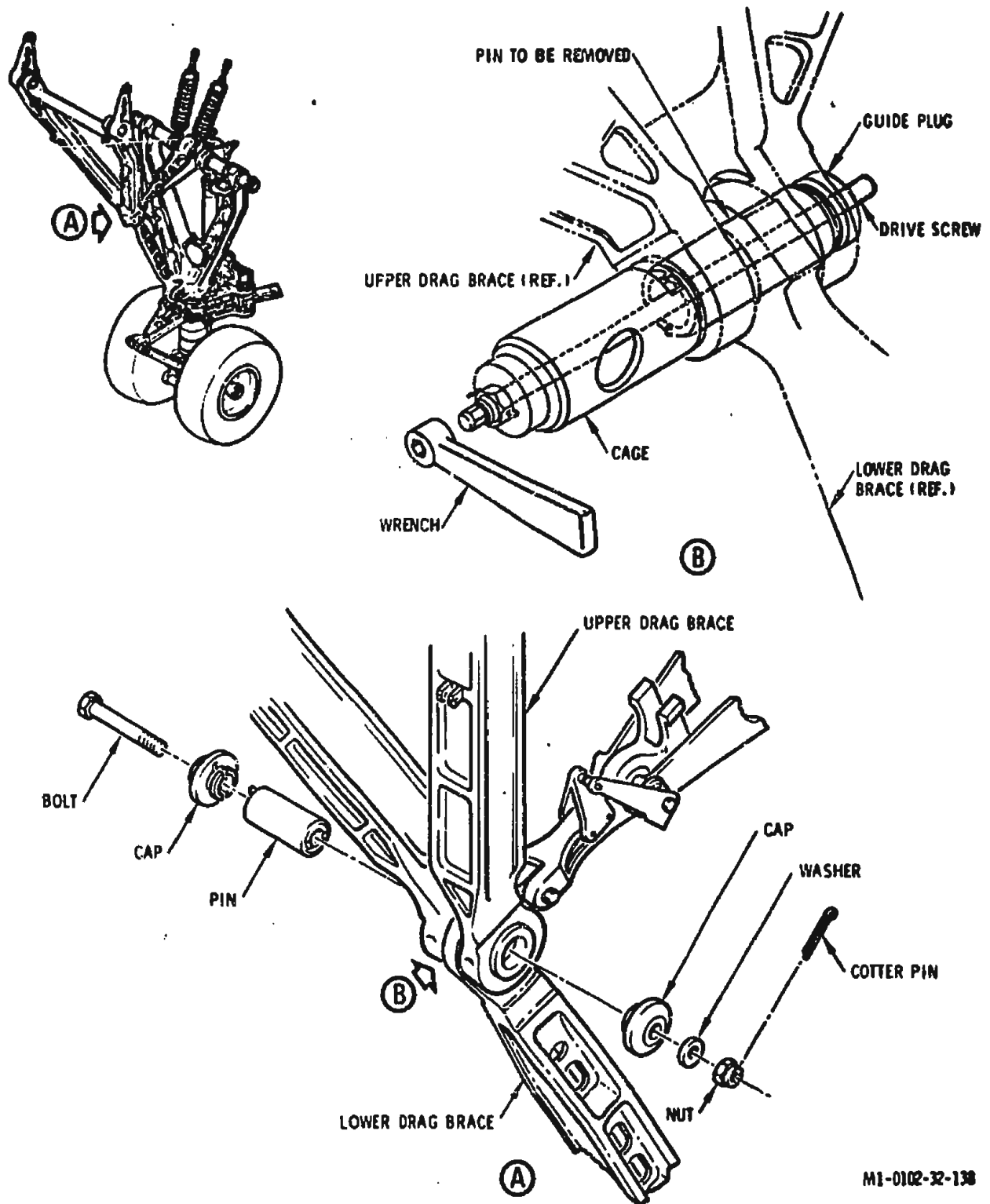
HH 6618
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Nose Landing Gear Jury Brace Springs Disconnect
Figure 404

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32-21-02
Page 408
Aug 15/75

LOCKHEED
MAINTENANCE MANUAL



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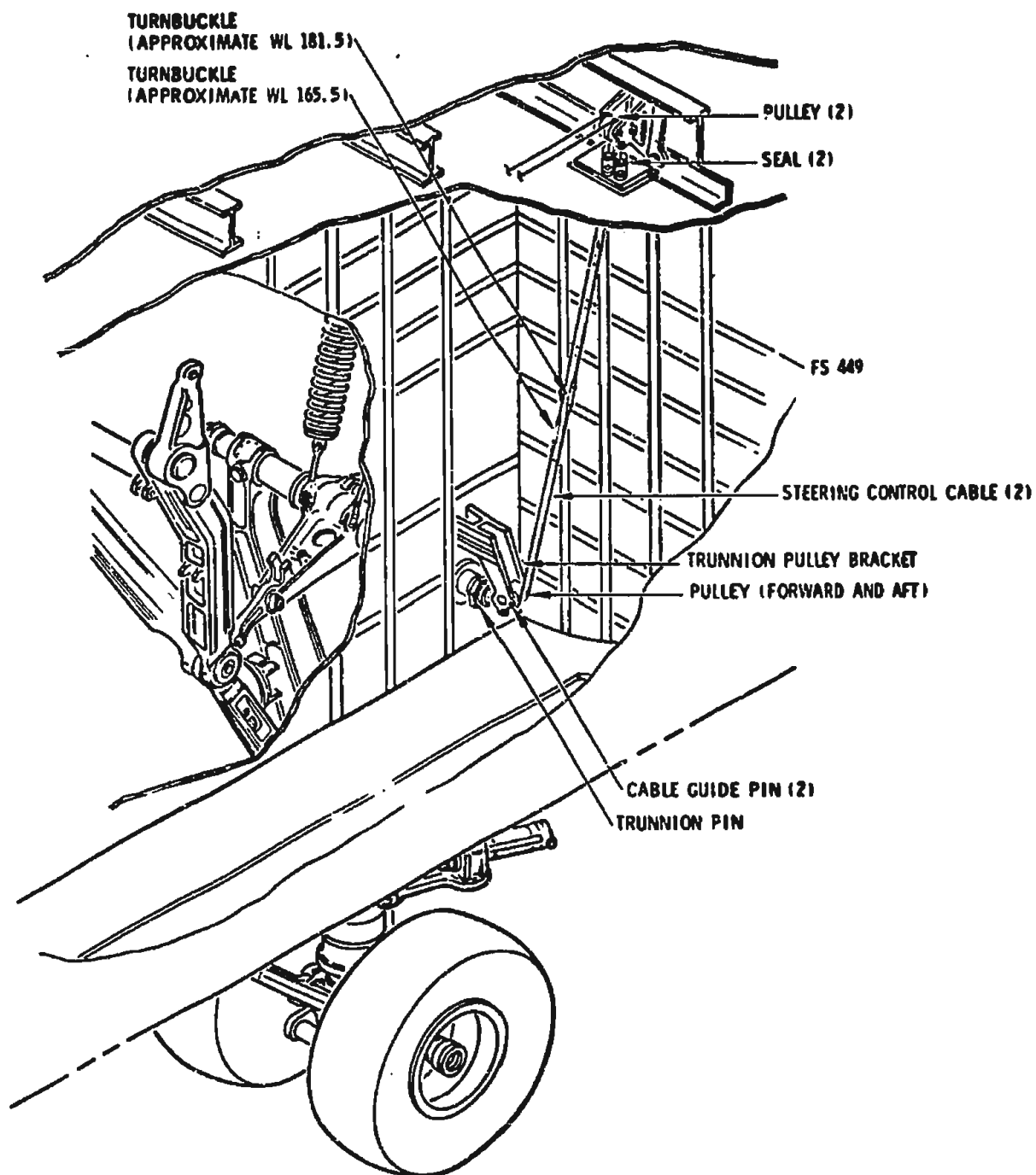
Nose Landing Gear Upper and Lower Drag Brace Disconnects
Figure 405

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32-21-02
Page 409
Nov 15/75

0018

LOCKHEED
MAINTENANCE MANUAL



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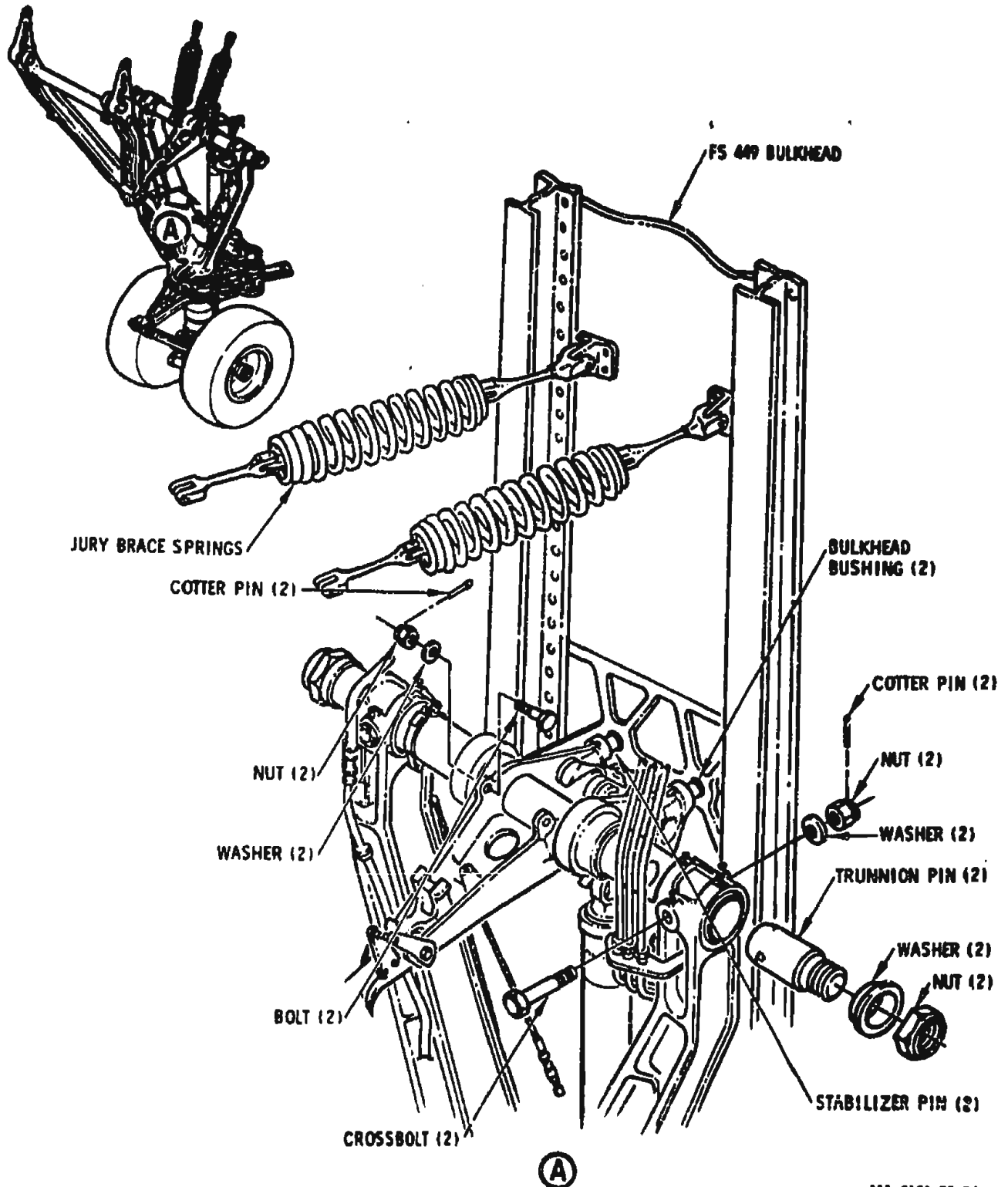
Nose Landing Gear Steering Control Cables Disconnect
Figure 406

EFFECTIVITY: ALL

0018

32-21-02
Page 410
Nov 15/75

LOCKHEED
MAINTENANCE MANUAL



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Nose Landing Gear Component Removal
Figure 407

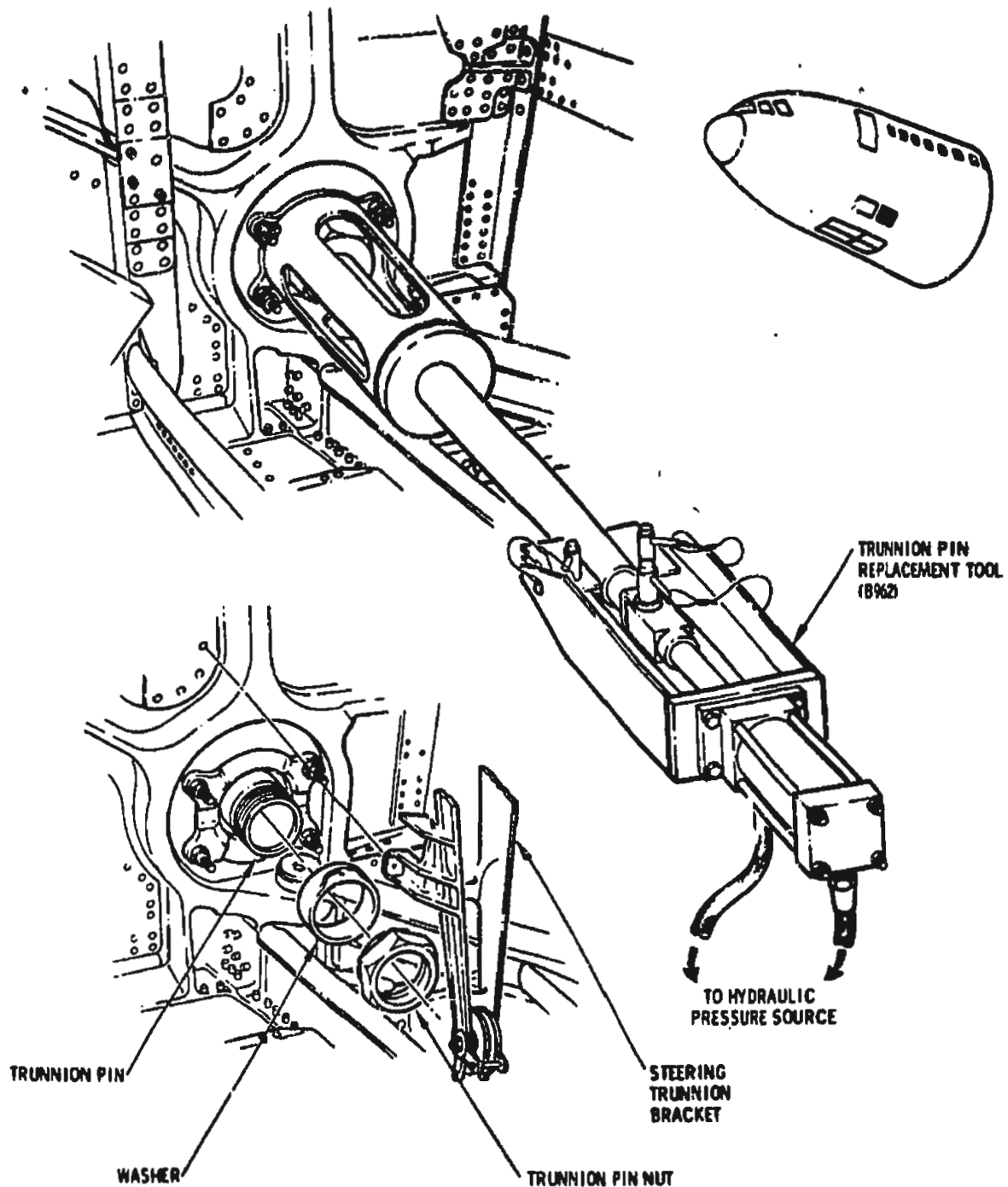
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32-21-02
Page 411
Jul 15/84

LOCKHEED
MAINTENANCE MANUAL



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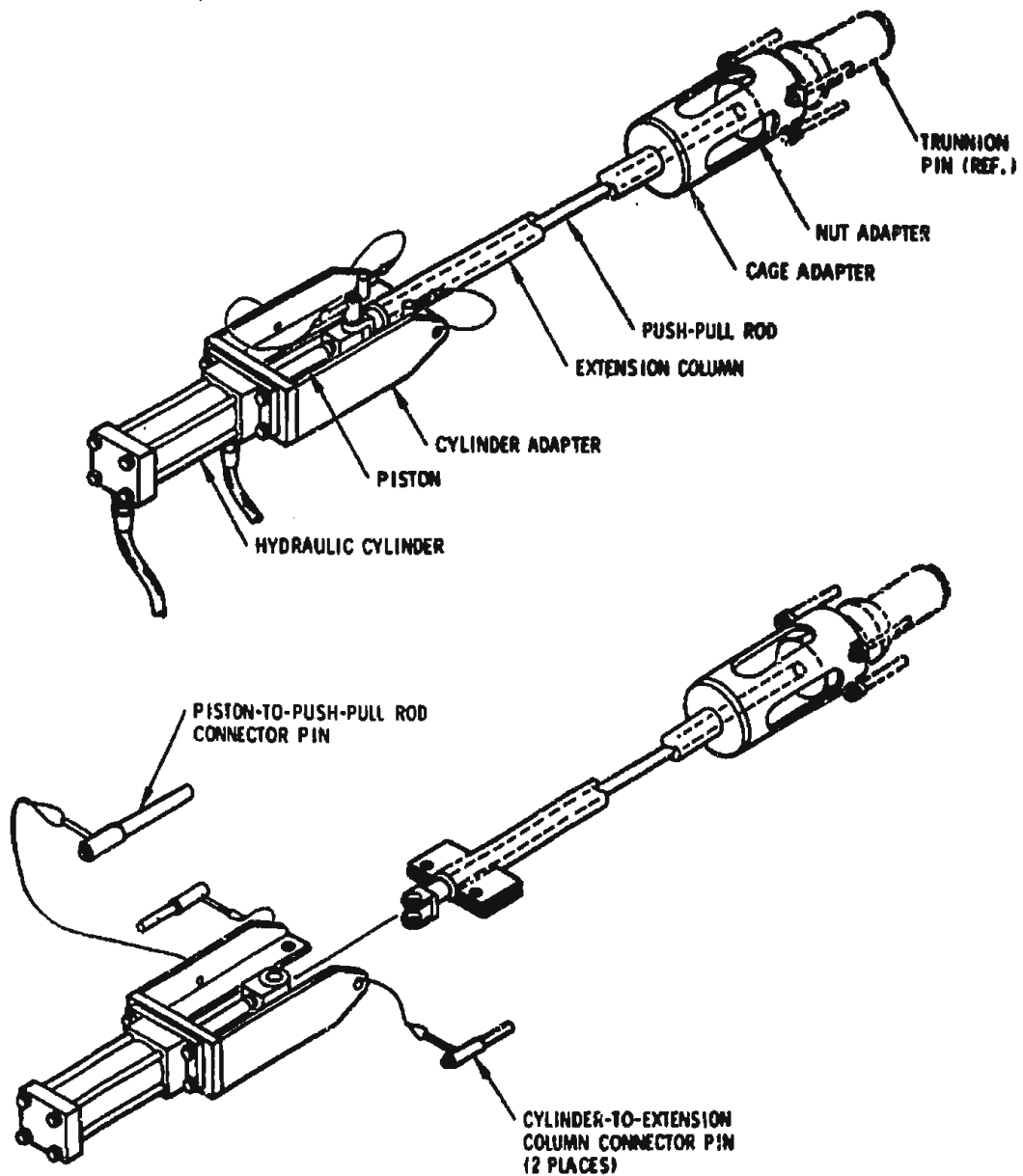
Nose Landing Gear Trunnion Pin - Removal and Installation
Figure 408

EFFECTIVITY: ALL

32-21-02
Page 412
Jul 15/84

001B

LOCKHEED
MAINTENANCE MANUAL



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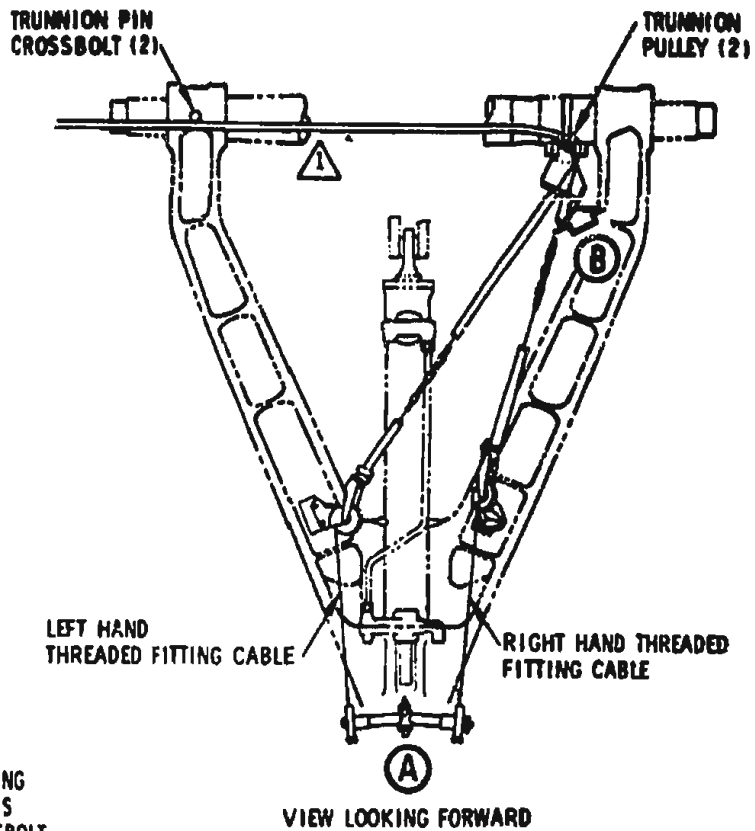
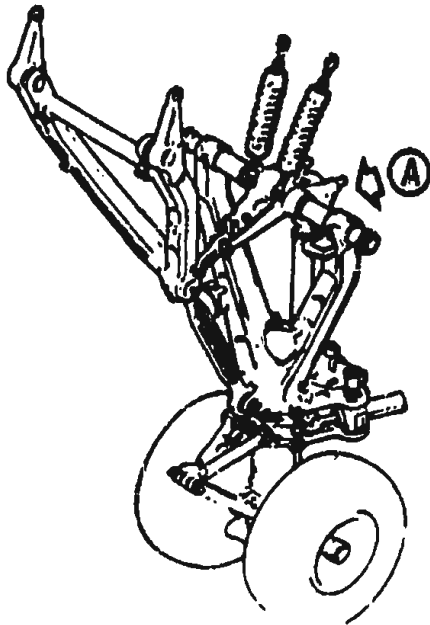
Nose Landing Gear Trunnion Pin Replacement Tool Set
Figure 409

EFFECTIVITY: ALL

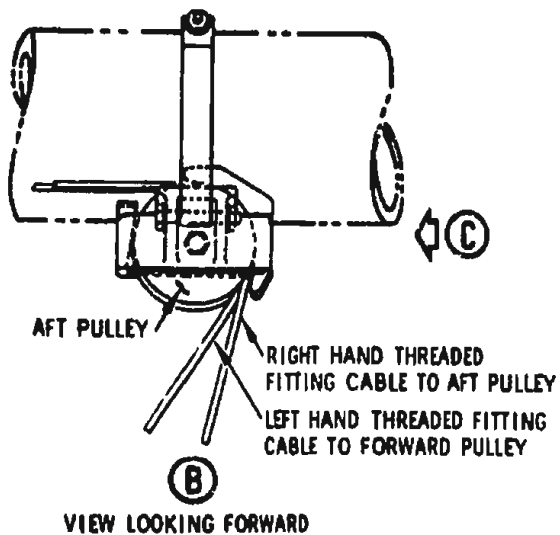
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32-21-02
Page 413
Jul 15/84

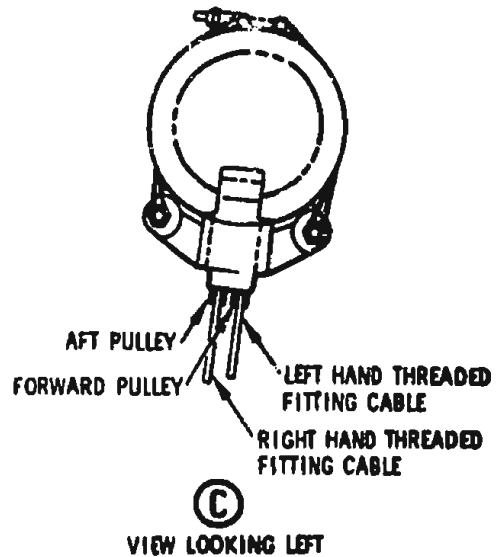
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MAINTENANCE MANUAL



WARNING
1 CABLES MUST NOT CROSS IN ROUTING THROUGH TRUNNION AND MUST PASS BENEATH LEFT TRUNNION PIN CROSSBOLT



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Nose Landing Gear Steering Cable Routing
Figure 410

EFFECTIVITY: ALL

32-21-02
Page 414
Jul 15/84

001B

LOCKHEED
MAINTENANCE MANUAL

- (d) Lock upper tube in place using lockpin.
- (2) Connect chain hoist to hoist fixture shackle.
 - (3) Hang sling assembly to chain hoist using eyebolt (Ref. Fig. 412).
 - (4) Position sling straps around trunnion tube and secure to bolts in sling assembly; ends must be positioned between washers and tube.
 - (5) Lock sling straps to tube using lockpins.
 - (6) Using chain hoist, take up slack until weight of gear is supported by bootstrap equipment (Ref. Fig. 413).
 - (7) Remove left and right trunnion pin nuts and washers (Ref. Fig. 407 and 408).
 - (8) Remove trunnion pin to trunnion tube crossbolts (Ref. Fig. 407).
 - (9) Using NLG trunnion pin replacement tool set (Ref. Fig. 408 and 409, remove left and right trunnion pins.
 - (10) Using hoist fixture crank, move NLG forward to clear bearings, then lower landing gear and secure to a cart or dolly that has four swiveling wheels or casters. Gear must be braced to stand alone when bootstrap equipment is removed.
 - (11) Verify that gear is securely attached to dolly, and remove bootstrap slings.
 - (12) Move gear forward to clear bearings, then rotate to facilitate removal.
 - (13) Move gear clear of aircraft.
 - (14) Remove NLG piston support assembly.
 - (15) The following inspection procedure must be performed whenever the NLG is removed from the aircraft.
 - (a) Using a flashlight and appropriate inspection mirror inserted through the bores of the support fitting, examine the interior surface of the NLG domed covers, the surfaces of the fitting hidden by the domed covers and the inside of the fitting bores.

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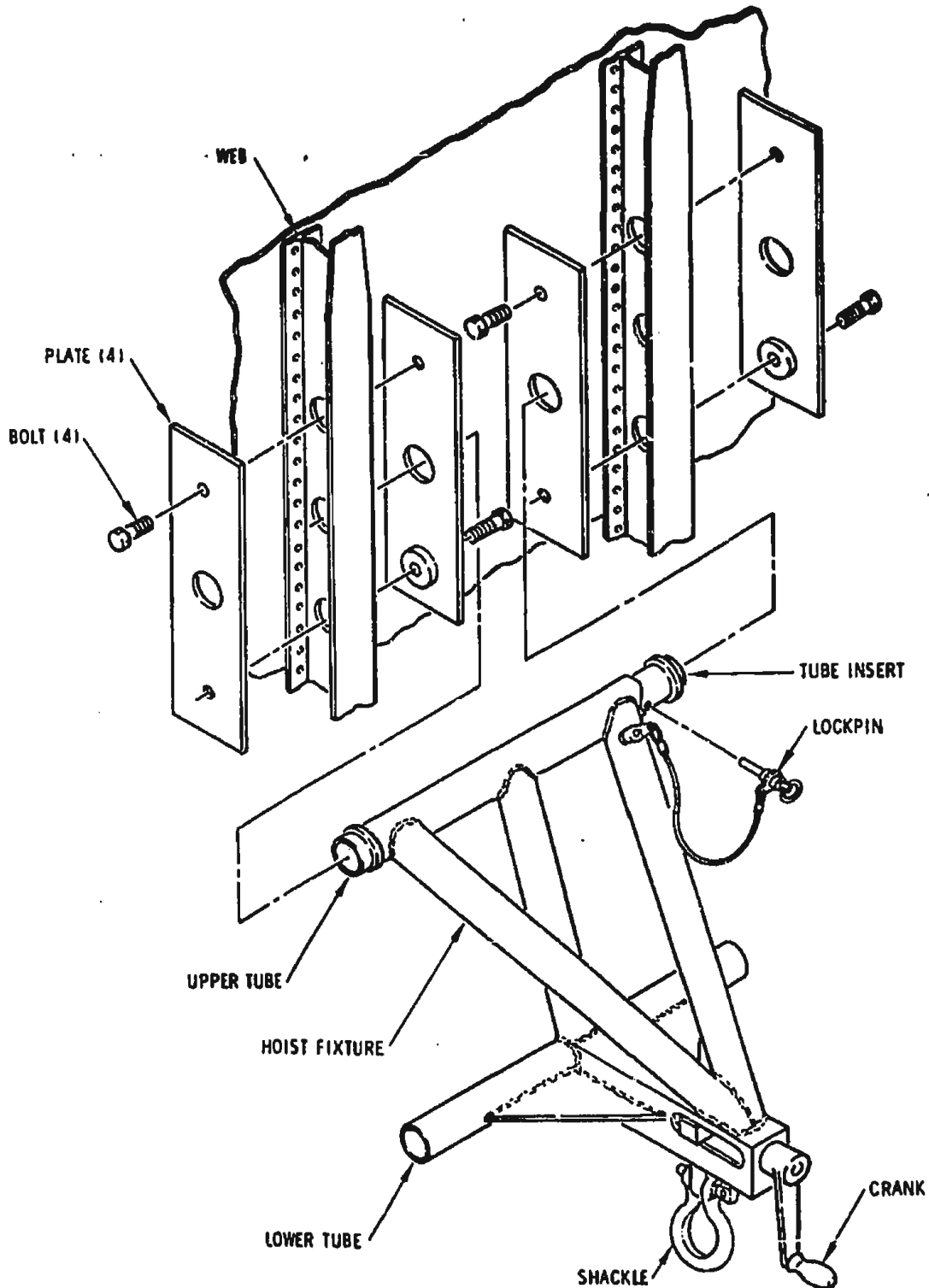
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EFFECTIVITY: ALL

001B

32-21-02
Page 415
Jun 15/92

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-547

Hoist Fixture Installation
Figure 411

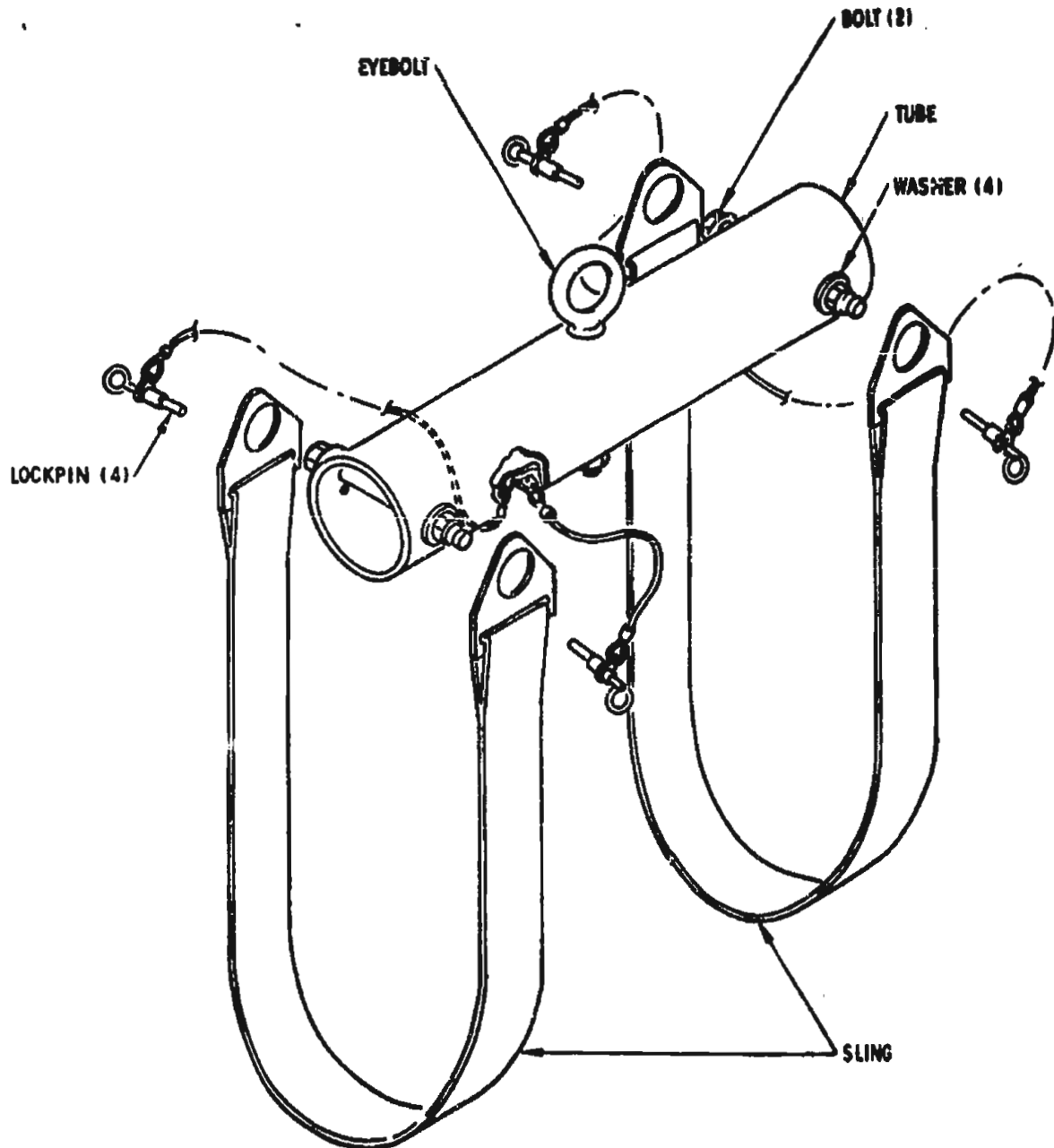
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EFFECTIVITY: ALL

001B

32-21-02
Page 416
Jul 15/84

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-540

Sling Assembly
Figure 412

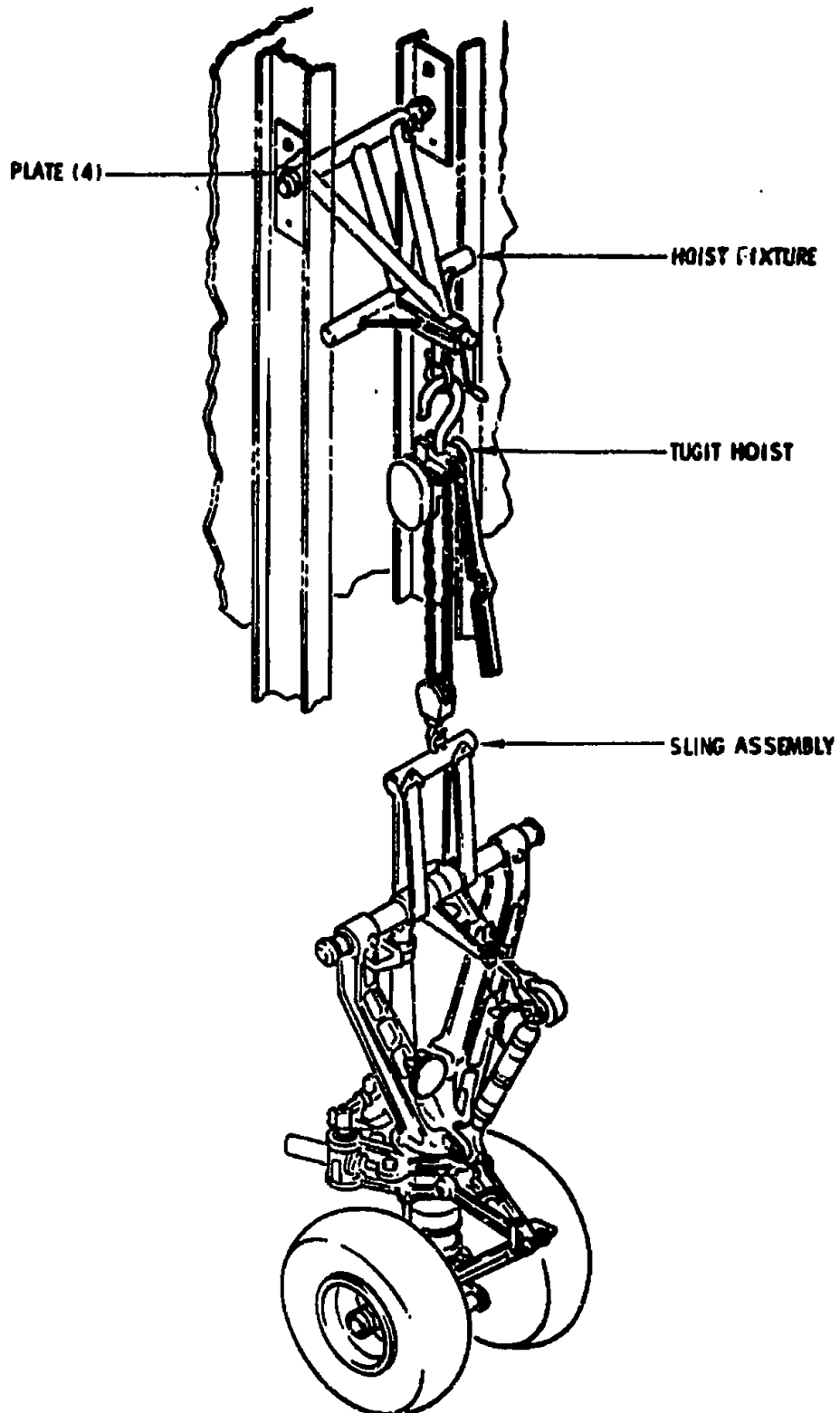
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EFFECTIVITY: ALL

001B

32-21-02
Page 417
Jul 15/84

LOCKHEED
MAINTENANCE MANUAL



MI-0100-32-509

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Bootstrap Equipment Component Location
Figure 413

EFFECTIVITY: ALL

001B

32-21-02
Page 418
Jul 15/84

LOCKHEED
MAINTENANCE MANUAL

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- (b) If the inside surface of the domed covers and the hidden surfaces of the fitting are free of corrosion, spray the entire cavity formed by the domed cover with Corrosion Preventive Compound. After cure, completely fill cavity with regular lubricating grease.

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- (b) If corrosion is detected in Step (a), refurbish in accordance with SB32-219.

C. Installation (Using Bootstrap Equipment)

- (1) Position NLG to be installed on cart or dolly that has four swiveling wheels or casters. NLG piston support assembly must be installed, strut must be deflated and valve removed.
- (2) Coat OD of stabilizer pins with grease.
- (3) Rotate gear crossways to installed position and move to a point approximately one foot forward of trunnion bearings.
- (4) Rotate gear so that stabilizer pins are facing aft.
- (5) Repeat Steps B(1) through (5) to install bootstrap equipment.
- (6) Rotate crank clockwise until shackle is in full forward position (Ref. Fig. 412).
- (7) Using chain hoist, raise gear until stabilizer pins are in alignment with bulkhead bushings. Remove transportation cart or dolly. (8) Rotate crank counterclockwise to insert stabilizer pins in bushings (Ref. Fig. 407).
- (9) Use chain hoist and crank to align trunnion tube with bearings.

WARNING: WHEN THREADING STEERING CABLES THROUGH TRUNNION, CABLES MUST NOT BE PERMITTED TO CROSS.

- (10) Thread steering cables through left trunnion bearing, ensuring that cables are routed as follows (Ref. Fig. 410):
 - (a) Left-hand threaded cable fitting goes up left strut to forward trunnion pulley.
 - (b) Right-hand threaded cable fitting goes up right strut to aft trunnion pulley.

EFFECTIVITY: ALL

001B

32-21-02
Page 419
Jun 15/92



MAINTENANCE MANUAL

- (11) Coat trunnion pins with grease and install. If required, use trunnion pin replacement tool (Ref. Fig. 409).
- (12) Position trunnion pins so that crossbolt holes are in alignment.
- (13) Verify that steering cables are beneath left crossbolt holes and install crossbolts (Ref. Fig. 407 and 410).
- (14) Secure crossbolts with washers and nuts. Safety nuts with MS24665-302 cotter pins.
- (15) Coat trunnion pin threads with low adhesion sealing compound (Ref. 20-51-04).
- (16) Install trunnion pin washers and nuts; do not tighten.
- (17) Tighten left trunnion pin nut until all clearance is removed between washer and bearing, and between bearing and trunnion tube. Back off nut to allow a 0.005 to 0.030 inch gap between nut and washer.
- (18) Safety washer to nut with lock-wire (Ref. Fig. 408).
- (19) Tighten right trunnion pin nut until all clearance is removed between washer and bearing. Back off nut to allow a 0.050 to 0.090 inch gap between nut and washer.
- (20) Safety washer to nut with lock-wire.

NOTE: Each trunnion pin must be lockwired to the washer in two places to prevent rotation in either direction.

D. Completion Procedures

- (1) Connect upper drag brace to lower drag brace (Ref. Fig. 405).
- (2) Connect operating rods to left and right aft doors (Ref. Fig. 402).
- (3) Connect operating rods to left and right forward doors.
- (4) Remove tags and connect electrical connectors at rear of nosewheel well, FS 449 bulkhead (Ref. Fig. 403).
- (5) Remove caps from hoses and bulkhead fittings and connect hydraulic hoses at support bracket. Hoses must not cross.

R EFFECTIVITY: ALL

001B

32-21-02
Page 420
Jun 15/92

LOCKHEED
MAINTENANCE MANUAL

- (6) Connect jury brace springs to upper jury brace assembly (Ref. Fig. 404). Remove bungee spring tool. Safety nut with MS24665-153 cotter pin.

WARNING: CABLES MUST NOT CROSS IN TRUNNION, OR WHEN EXITING TRUNNION TO PULLEYS.

- (7) Install steering cable trunnion pulley bracket, and route cables as follows (Ref. Fig. 406):
- (a) Left-hand threaded cable fitting goes around forward pulley, up to turnbuckle at WL 165.5
 - (b) Right-hand threaded cable fitting goes around aft pulley, up to turnbuckle at WL 181.5.
 - (c) Install cable guide pins.
- (8) Connect steering cables.
- (9) Lower aircraft and remove jack.
- (10) Remove NLG piston support assembly (Ref. Fig. 401).
- (11) Service strut with fluid and air or nitrogen (Ref. 12-14-13).
- (12) Perform nose gear steering system adjustment and test (Ref. 32-51-00).
- (13) Install ducting in left and right ECS compartments that was removed to gain access to trunnion pins.
- (14) Close left and right ECS doors 117AL and 118CR.
- (15) Jack aircraft as required to clear nose wheel three inches above ground level.

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

R EFFECTIVITY: ALL

001B

32-21-02
Page 421
Jun 15/92

LOCKHEED
MAINTENANCE MANUAL

- (16) On pilots center instrument panel, zone 210, ensure that landing gear control is in the DOWN position.
- (17) Turn on hydraulic system C pressure (Ref. 29-11-00).
- (18) Bleed NLG retract actuator by opening bleed valve at top and bottom of actuator assembly.
- (19) Close and lock the two forward NLG doors.
- (20) Lubricate NLG (Ref. 12-24-00).
- (21) Remove tags and close circuit breakers opened in Steps 4A (13), (14), and (15).
- (22) Remove tag from landing gear control lever.
- (23) Perform NLG retraction and extension adjustment and test (Ref. 32-30-00).
- (24) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (25) Turn off electrical power (Ref. 24-00-00).
- (26) Verify that NLG downlock safety pin is installed.
- (27) Lower aircraft and remove jack (Ref. 7-11-00).
- (28) Remove wheel chocks and chain binders forward and aft of main landing gear wheels as necessary.

LOCKHEED
MAINTENANCE MANUAL

NOSE LANDING GEAR SHOCK STRUT - APPROVED REPAIRS

1. General

This procedure describes the approved methods of repair of the NLG shock strut consisting of:

Removal of active Seals (Para. 4A)

Replacement of Active Dynamic Seal (Para. 4B)

Replacement of Active Static Seal (Para. 4C)

Installation after Replacement of Active Seals (Para. 4D)

Removal and Installation of Active and Spare Seals (Para. 4E)

2. Equipment and Materials

Hydraulic Fluid, MIL-H-5606, or equivalent (Ref. 12-14-13, servicing for details)

NLG Seal Replacement Tool Set, PN B706, or equivalent

Curved shims (Ref. Fig. 802)

Lock-wire, Fed Spec QQ-W-390, 0.025-inch diameter, or equivalent

3. Referenced Procedures

7-11-00	Wing and Fuselage Jacking - Maintenance Practices
12-14-13	Nose Landing Gear Strut - Servicing
31-41-00	Weight and Balance System - Adjustment and Test
R 32-42-01	Nose Landing Gear Wheel and Tire Assembly - Removal and Installation

4. Approved Repairs

A. Removal of Active Seals

- (1) Disconnect upper torque arm from lower torque arm.

EFFECTIVITY: ALL

32-21-02
Page 801
May 15/89

001B



- (2) Jack aircraft at forward fuselage jack point (Ref. 7-11-00) to obtain strut piston extension of approximately 13 inches, but not more than 14 inches.

NOTE: If aircraft is jacked high enough (more than 18 inches) to permit centering cams to be engaged, sudden downward impact pressure may cause the lower cam to be disengaged from the strut cylinder. If the lower cam is disengaged, retrieve the cam retaining ring and locking pins (retaining ring may be lodged in cylinder split retainer recess).

WARNING: AIR OR NITROGEN CHARGE MUST BE REDUCED TO ZERO BEFORE DISASSEMBLING SHOCK STRUT.

- (3) Release air or nitrogen charge from shock strut by removing dust cap on charging valve and turning upper nut on valve assembly three or four turns counterclockwise.

CAUTION: CARE MUST BE EXERCISED TO PREVENT SPILLING HYDRAULIC FLUID ON TIRES AND WHEELS. SUITABLE PROTECTIVE COVERS AND CAPS MUST BE EMPLOYED.

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- (4) Place a container below shock strut to collect hydraulic fluid that will drain when gland retainer is removed.
- (5) At lower end of cylinder, remove bolts and washers that attach the four segments of split retainer to retainer ring (Ref. Fig. 801). Slide retainer ring, retainer, and scraper downward on piston. If retainer ring does not release easily, screw 1/4-28 bolts, 1 inch long, into threaded holes in retainer. Continued tightening of these bolts will jack retainer ring out of strut (Ref. Fig. 801, View A).
- (6) Disengage and remove four segments of split retainer from internal recess at bottom of cylinder.
- (7) Assemble tool set lower seal removal/installation tool assembly in place, with all screws fully engaged into threaded puller holes in bearing adapter and upper plate butted against lower end of cylinder (Ref. Fig. 802).

CAUTION: DO NOT APPLY ANY FORCE TO WITHDRAW BEARING OR BEARING ADAPTER, UNLESS SCREWS ARE FULLY ENGAGED IN BEARING ADAPTER THREADED HOLES.

EFFECTIVITY: ALL

32-21-02

Page 802
Jul 15/84

001B

LOCKHEED
MAINTENANCE MANUAL

- (8) Rotate removal bolts simultaneously to move adapter downward until it is exposed. Move adapter down on strut as far as possible.
- (9) Remove tool assembly and reinstall above adapter in position to pull bearing down.
- (10) Observe caution [Ref. Step 4A(7)] and move bearing out of cylinder. Rotate removal bolts simultaneously.
- (11) Remove tool assembly.
- (12) Remove bearing spacer from seal adapter by removing retaining pins. Slide bearing spacer out of work area (Ref. Fig. 801).
- (13) Remove old backup rings and dynamic seal from groove with a hooked tool. Cut old seal to remove from around piston.
- (14) Remove backup rings and cut static seal from groove, as required.

B. Replacement of Active Dynamic Seal

- (1) Flush adapter seal grooves with clear hydraulic fluid.
- (2) Carefully remove a spare dynamic seal and backup ring set from carrier groove in the bearing (Ref. Fig. 803). Avoid stretching backup rings and seal.

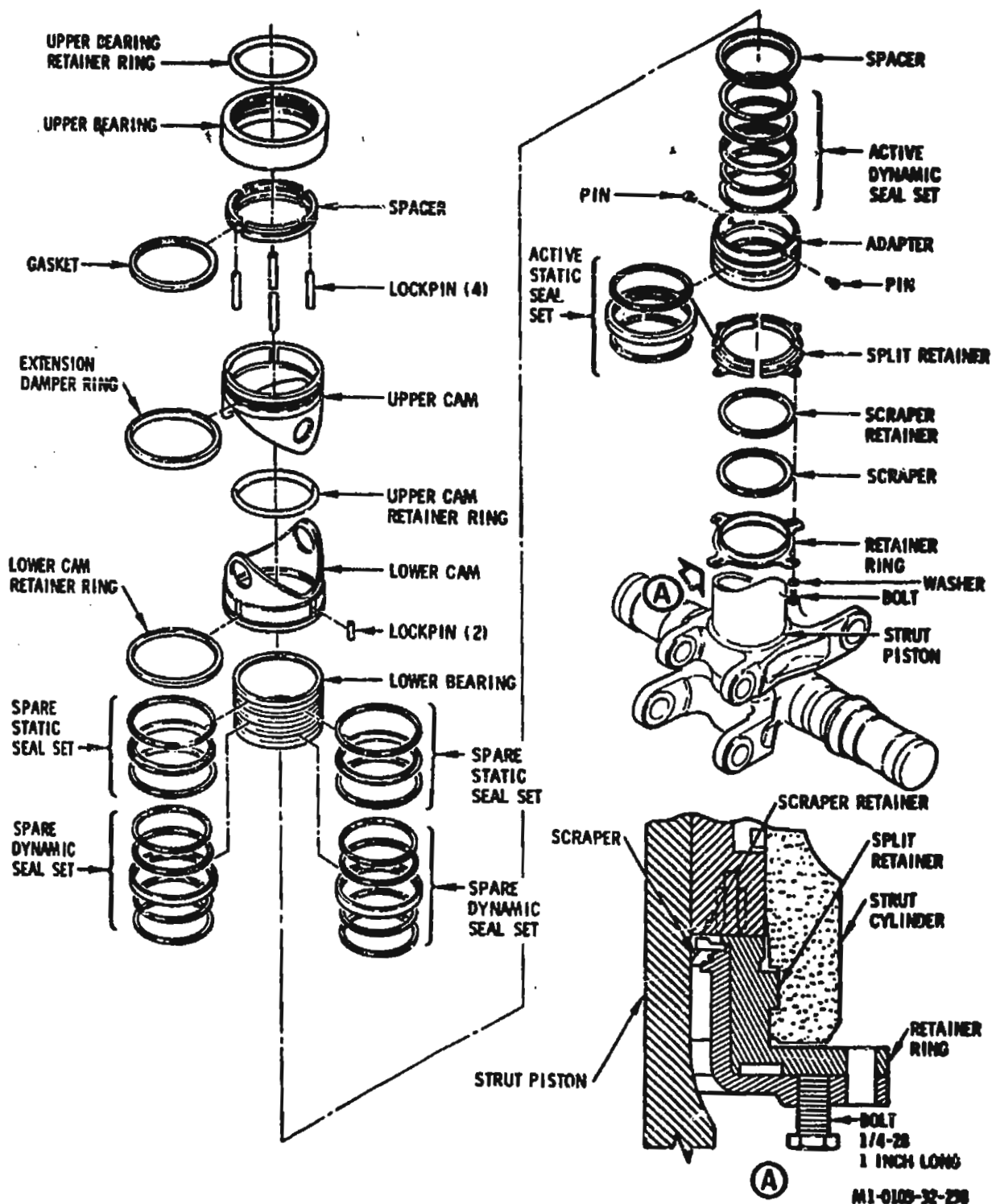
NOTE: Backup rings are removed with minimum stretching by pulling each ring into a spiral, rotating ring into a vertical plane, and withdrawing ring from piston. Dynamic seals have four backup rings. Static seals have two backup rings.

- (3) Preload backup rings by circumferentially overlapping ends about 3-inches to make sure backup rings hug piston with zero clearance.
- (4) Place lower backup ring (black) in groove first, and then a backup ring (white) with radius next to rubber. Rotate scarf cuts to place them 180 degrees apart.
- (5) Ensure that there is no gap between bottom backup rings and shock strut piston. Coat seal with hydraulic fluid and place edge of seal flange into groove. Do not attempt to stuff seal into groove at this time.
- (6) Work lower flange of seal into groove by rapidly running hands around edge until seal is into the groove

R EFFECTIVITY: ALL
R
001B

32-21-02
Page 803
Aug 15/77

LOCKHEED
MAINTENANCE MANUAL



Nose Landing Gear Strut Seal Assembly Component Positions
Figure 801

EFFECTIVITY: ALL

32-21-02
Page 804
Aug 15/77

0018

LOCKHEED
MAINTENANCE MANUAL

approximately to center of seal cross section (Ref. Fig. 803). The rubber will appear to be in an angular position to piston. It should be even all the way around, with no part of the edge deeper than another. Do not allow seal to work out of groove.

- (7) Install upper backup rings. Put white ring in place (radius down) against the rubber. Put the black ring on top, with scarf cut rotated 180 degrees from white ring scarf cut. Upper backup rings should fit concentrically, but should not hug the strut.
- (8) Move bearing spacer down on top edge of backup and seal assembly. Use bearing as a sliding hammer to apply sharp blows to spacer until spacer is completely seated and retaining pins can be installed.
- (9) Install bearing spacer retaining pins.

C. Replacement of Active Static Seal

- (1) Flush adapter seal groove with clean hydraulic fluid.
- (2) Carefully remove a spare static seal, and backup ring set from carrier groove in the bearing. Slide seal into place in adapter groove with a minimum of stretching.

NOTE: Backup rings are removed with minimum stretching by pulling each ring into a spiral, rotating ring into a vertical plane, and withdrawing ring over the bearing.

- (3) Install backup rings with radius next to rubber (Ref. Fig. 803).

D. Installation after Replacement of Active Seals

- (1) If lower cam was not removed, verify that cam is correctly positioned as follows:

CAUTION: IT IS ESSENTIAL THAT LOWER CAM IS CORRECTLY POSITIONED IN CYLINDER PRIOR TO INSTALLING LOWER BEARING.

- (a) Measure distance from lower face of cam to lower edge of cylinder. Dimension must not be less than 7-3/4 inches.
- (b) If dimension is less than 7-3/4 inches, cam has been displaced downward, cam retainer ring has come out of groove, and lockpins may have dropped

R EFFECTIVITY: ALL
R

0018

32-21-02
Page 805
Aug 15/77

LOCKHEED
MAINTENANCE MANUAL

out of cylinder. If cam has been displaced, remove cam, cam retainer ring, and lockpins. Install in accordance with Step (2).

(2) If lower cam was removed, proceed as follows:

- (a) Coat lockpins and cam lockpin grooves with grease.
- (b) Position lockpins in cam grooves with tapered ends up (Ref. Fig. 801).

CAUTION: IT IS ESSENTIAL THAT INITIAL PLACEMENT OF LOCKPIN IS IN GROOVE OF CAM NOT CYLINDER, OTHERWISE PIN WILL BE PUSHED ABOVE CAM.

- (c) Move cam up into cylinder but leave retaining ring groove clear of cylinder.
- (d) Rotate cam so that lockpins are aligned with corresponding grooves in cylinder bore and holes in cam lobes are oriented forward and aft.
- (e) Position retaining ring in groove with ring gap oriented 90-degrees from lockpins. Cover ring with three curved shims. Do not cover lockpins with shims. Shims must be oriented such that widest shim covers retainer ring gap and remaining two shims are positioned on opposite side of cam, close to lockpins.
- (f) Using shims, hold ring in place while moving cam upward into cylinder until ring is above split retainer recess in cylinder.
- (g) Hold cam in position and remove shims.

R **CAUTION:** DO NOT FORCE CAM INTO CYLINDER. IF RESISTANCE IS ENCOUNTERED, REMOVE CAM AND CHECK FOR DISPLACEMENT OF LOCKPINS.

- (h) Using cam replacement tool (Ref. Fig. 802), engage tool pins in cam holes and slowly push cam up into cylinder bore until seated.

R **CAUTION:** IT IS ESSENTIAL THAT LOWER CAM IS CORRECTLY POSITIONED IN CYLINDERS PRIOR TO INSTALLING LOWER BEARING.

- (i) Attempt to rotate cam using cam replacement tool as a wrench. Cam will not rotate if lockpins are in cylinder grooves.

EFFECTIVITY: ALL

0018

32-21-02
Page 806
Nov 15/81

LOCKHEED
MAINTENANCE MANUAL

(j) Measure distance from lower face of cam to lower edge of cylinder. Dimension must not be less than 7-3/4 inches.

(k) If dimension is less than 7-3/4 inches, cam has been displaced downward, cam retainer ring has come out of groove, and lockpins may have dropped out of cylinder. If cam has been displaced, remove cam, retainer ring, and lockpins. Repeat Steps (a) through (k).

(3) Flush shock strut piston, lower bearing, and adapter with hydraulic fluid.

(4) Install lower seal removal/installation tool assembly (Ref. Fig. 802). Rotate installation bolts to slide lower bearing upward as far as possible. Remove tool assembly.

(5) Install tool assembly and slide adapter upward as far as possible.

(6) Continue until adapter is far enough into cylinder to permit installation of split retainer segments (Ref. Fig. 803). Remove tool assembly.

(7) Install four split retainer segments.

(8) Slide scraper, scraper retainer, and retainer ring upward into cylinder.

(9) Install bolts into gland retainer segments.

(10) Safety bolts with lock-wire.

R (11) Lower aircraft jack (Ref. 7-11-00)

R (12) Service shock strut (Ref. 12-14-13).

E. Removal and Installation of Active and Spare Seals

R **CAUTION:** AIRCRAFT MUST BE IN JACKING CONFIGURATION (BOTH
R WING ENGINES INSTALLED) AND CENTER OF GRAVITY MUST
R BE FORWARD OF F.S. 1245 PRIOR TO JACKING AIRCRAFT
R AT NOSE GEAR ONLY.

R (1) Jack aircraft at forward fuselage jack point until
R wheels are clear of ground.

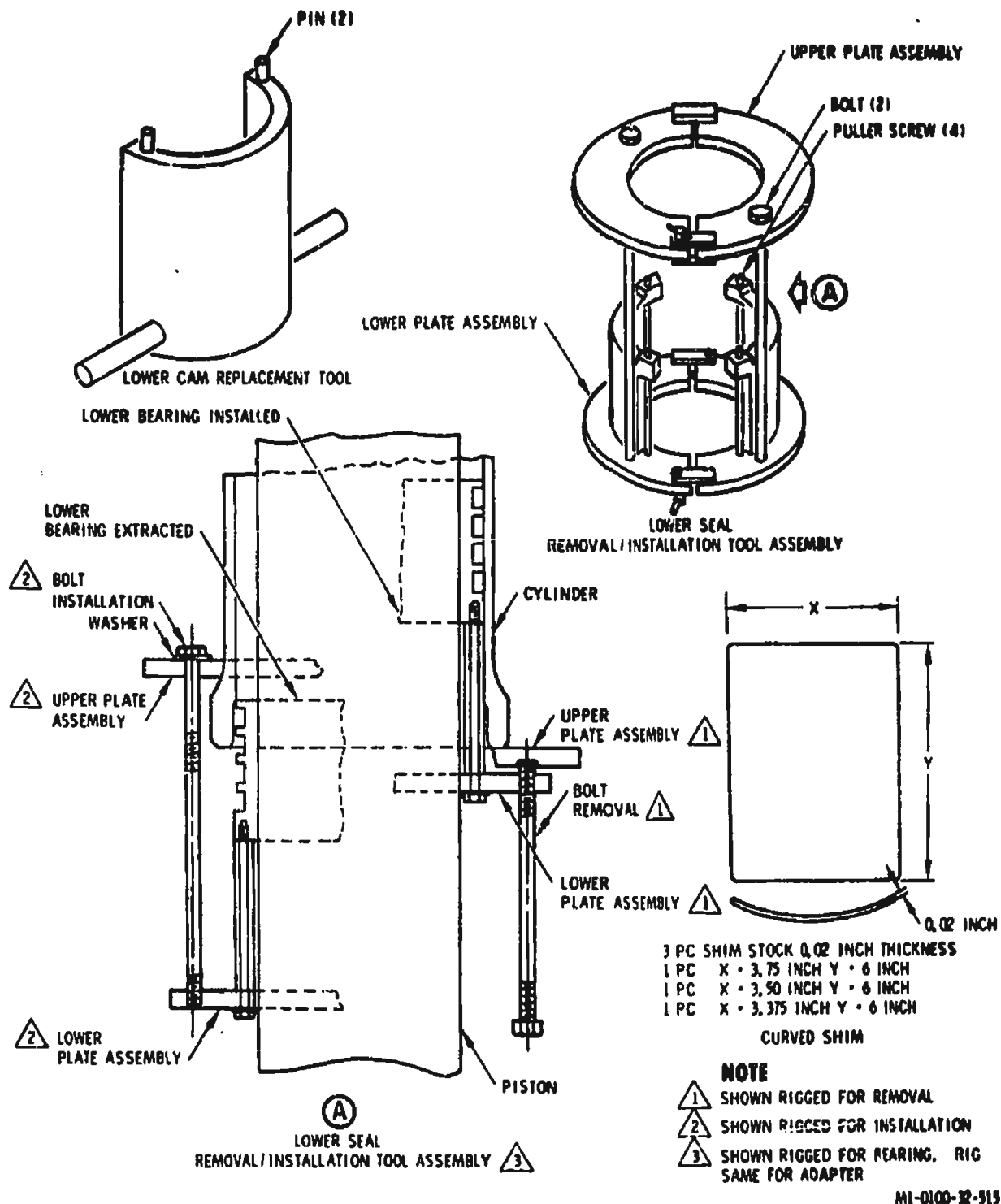
R (2) Release air charge from strut by removing dust cap from
charging valve and turning upper nut on valve three to
four turns counterclockwise.

EFFECTIVITY: ALL

001B

32-21-02
Page 807
Jul 15/84

LOCKHEED
MAINTENANCE MANUAL



**Nose Landing Gear Strut Adapter, Lower Cam,
and Lower Bearing Tools
Figure 802**

R R
001B EFFECTIVITY: ALL

32-21-02
Page 808
May 15/75



MAINTENANCE MANUAL

- R (3) Place a four-gallon container under strut to collect hydraulic fluid that will drain when drain plug is removed.
- R (4) Remove drain plug from lower end of strut. Allow fluid to drain until flow stops.
- R (5) Remove piston with wheels removed as follows:
- R (a) On FE/SO overhead circuit breaker panel CB2, zone 215, open and tag circuit breakers FLIGHT STATION MISC - WEIGHT & BAL - AC (F5) and DC (F6). (b) Remove both wheels and bearings (Ref. 32-42-01).
- R (b) On aircraft 001-014, disconnect weight and balance system wiring connector at lower torque arm.
- R (c) On aircraft 015-999, disconnect weight and balance system wiring as follows:
- At nose wheel well aft bulkhead junction box, disconnect nose wheel well disconnect 9811-P886:
 - Refer to WDM 20-21-01 and remove following contacts from connector 9811-P886
- | | | | |
|--------------|-------|--------------|--------|
| 22B (20 GRN) | pin 4 | 19B (20 GRN) | pin 10 |
| 21B (20 WHT) | pin 5 | 18B (20 WHT) | pin 11 |
| 7B (20 BLK) | pin 7 | 4B (20 BLK) | pin 13 |
| 6B (20 RED) | pin 8 | 3B (20 RED) | pin 14 |
| 23E18TU FR1 | pin 6 | 20E18TU FR3 | pin 12 |
| 8E18TU FR2 | pin 9 | 5E18TU FR4 | pin 15 |
- Attach pull-wires to disconnected wires. Ensure that length of pull-wire is sufficient to reach from connector to J-box located on upper torque arm.
 - Disconnect branched Y-shaped conduit (transducer to torque arm J-box) from J-box and upper torque arm, and remove wires from upper conduit. Pull-wires are to remain in conduit.
 - Disconnect pull-wires from electrical wires.

EFFECTIVITY: ALL

001B

32-21-02

Page 809
Jul 15/84

LOCKHEED
MAINTENANCE MANUAL

- Coil electrical wires, cover with plastic bag or equivalent cover, and tape to Y-shaped conduit so that hydraulic fluid is prevented from reaching wires and inside of conduit.
- Cover J-box to prevent entry of hydraulic fluid.

R (d) Jack aircraft until bottom of strut cylinder is 48 inches off ground.

CAUTION: WEIGHT AND BALANCE TRANSDUCERS ARE EXTREMELY DELICATE. CARE MUST BE EXERCISED TO ENSURE THAT THEY ARE NOT IMPACTED OR SUBJECTED TO LOADS APPLIED DURING HANDLING OF THE STRUT PISTON.

R (e) At lower end of cylinder, remove bolts and washers attaching the four segments of split retainer to retainer ring. Slide retainer ring, scraper, and scraper retainer down piston. Remove split retainer segments (Ref. Fig. 801).

R (f) Support piston and disconnect torque arms at apex pin.

R (g) Lower piston to ground. Cushion lower end of piston.

NOTE: Piston should still be inserted into cylinder approximately four inches. When lower cam emerges from cylinder, lockpins may fall out of grooves.

R (h) Remove lower cam retaining ring from split retainer recess in cylinder.

R (i) Support upper end of piston as lower end is walked forward far enough to completely remove piston from cylinder.

R (6) As an alternate method, remove piston with wheels installed as follows:

CAUTION: WEIGHT AND BALANCE SYSTEM MUST BE DISCONNECTED IN THE SAME MANNER CALLED OUT IN STEP 4E(5).

(a) Jack aircraft at fuselage jack point until shock strut piston is extended approximately 15 inches (Ref. 7-11-00).

EFFECTIVITY: ALL

001B

32-21-02
Page 810
Jul 15/84



CAUTION: WEIGHT AND BALANCE TRANSDUCERS ARE EXTREMELY DELICATE. CARE MUST BE EXERCISED TO ENSURE THAT THEY ARE NOT IMPACTED OR SUBJECTED TO LOADS APPLIED DURING HANDLING OF THE STRUT PISTON.

- (b) At lower end of cylinder, remove bolts and washers attaching the four segments of split retainer to retainer ring. Slide retainer ring, scraper, and scraper retainer down piston. Remove split retainer segments (Ref. Fig. 801).

WARNING: THE JURY BRACE SPRINGS EXERT CONSIDERABLE FORCE TO MAINTAIN THE JURY BRACE LOCKED. RESTRAINT OF THE JURY BRACE IS REQUIRED TO PREVENT A FORCEFULL RELOCKING OF THE GEAR.

- (c) Manually unlock nose landing gear.
- (d) Disconnect torque arms at apex pin.
- (e) Roll wheels forward along ground and support piston until it is completely withdrawn from cylinder. Support both piston and cylinder.
- (f) Remove lower cam retaining ring from split retainer recess.
- (7) At upper end of piston, remove gasket and spacer from between upper bearing and upper cam.
- (8) Slide bearing down onto upper cam and remove upper retainer ring.
- (9) Remove upper bearing, upper cam with extension damper ring, lockpins, and lower retainer ring from upper end of piston.
- (10) If lockpins have remained in grooves, remove lockpins.
- (11) Slide lower cam upward off piston; remove lockpins.
- (12) Slide lower bearing upward off piston; remove spare seals.
- (13) Slide assembly consisting of active seals, pins, spacer, and adapter upward off piston; remove active static seals.
- (14) Pull pins and separate spacer from adapter; remove active dynamic seal. Discard all seals.

R EFFECTIVITY: ALL

001B

32-21-02
Page 811
May 15/88



MAINTENANCE MANUAL

- R (15) Install new active dynamic and static seals, with correctly positioned backup rings (Ref. Fig. 803), in adapter.
- R (16) Mate spacer to adapter and secure with pins (Ref. Fig. 801).
- R (17) Install spare dynamic and static seals, with correctly positioned backup rings, in lower bearing.
- R (18) Slide adapter and lower bearing downward on piston.
- R (19) Slide lower cam on piston; slip lower cam retaining ring over piston and cam and allow ring to drop to bottom of installed assemblies.
- R (20) Flush piston, bearing, adapter, spacer, cam, and retaining ring with hydraulic fluid.
- R (21) Install retainer ring in lower groove at upper end of piston.
- R (22) Install extension damper ring on upper cam; install upper cam on piston.
- R (23) Orient upper cam so that holes in cam lobes are facing cross-wise; install lockpins in piston and cam grooves.
- R (24) Install upper bearing on piston; install upper retainer ring in upper piston groove.
- R (25) Slide upper bearing upward to seat against upper retainer ring; place halves of split spacer in gap between upper bearing and upper cam. Install gasket in circumferential groove to secure split spacer in position.
- R (26) Wrap a length of lock-wire around upper cam extension damper ring to compress ring. Lock-wire should be long enough to leave a tail of approximately 18 inches to aid in retrieval. Secure lock-wire in such a manner that when it is slipped off the ring, it will pass easily over the cam.

NOTE: The purpose of the lock-wire is to hold the ring compressed until it reaches point X of the cylinder bore (Ref. Fig. 803). Narrowing of the bore at point X will force the lock-wire off the ring and allow the lock-wire to slide down the bore where it can be retrieved.

EFFECTIVITY: ALL

001B

32-21-02
Page 812
Jul 15/84



- R (27) Slowly slide piston into cylinder. A slight resistance will be felt when lock-wire reaches point X.

CAUTION: A JAMMED LOCK-WIRE WILL RESULT IN A CONSIDERABLE AMOUNT OF RESISTANCE. FORCING PISTON FURTHER INTO CYLINDER MUST NOT BE ATTEMPTED. REMOVAL OF PISTON FROM CYLINDER MUST BE PERFORMED TO DETERMINE THE CAUSE.

- R (28) Retrieve and remove lock-wire from piston.

- R (29) Slide piston further into cylinder but leave sufficient room to install lower cam.

- R (30) Coat lower cam lockpin grooves and lockpins with grease (Ref. Fig. 801).

- R (31) Position lockpins in cam grooves with tapered ends up.

- R (32) Move cam up into cylinder but leave retaining ring groove clear of cylinder.

CAUTION: IT IS ESSENTIAL THAT INITIAL PLACEMENT OF LOCKPIN IS IN GROOVES OF CAM NOT CYLINDER, OTHERWISE PIN WILL BE PUSHED ABOVE CAM.

- R (33) Rotate cam so that lockpins are aligned with corresponding grooves in cylinder bore and holes in cam lobes are oriented forward and aft.

- R (34) Position retaining ring in groove with ring gap oriented 90 degrees from lockpins. Cover ring with three curved shims (Ref. Fig. 802). Do not cover lockpins with shims. Shims must be oriented such that widest shim covers retainer ring gap and remaining two shims are positioned on opposite side of cam, close to lockpins.

- R (35) Using shims, hold ring in place while moving cam upward into cylinder until ring is above split retainer recess in cylinder.

- R (36) Hold cam in position and remove shims.

CAUTION: DO NOT FORCE CAM INTO CYLINDER. IF RESISTANCE IS ENCOUNTERED, REMOVE CAM AND CHECK FOR DISPLACEMENT OF LOCKPINS. REPEAT STEPS (30) THROUGH (34).

- R (37) Using cam replacement tool, engage tool pins in cam holes and slowly push cam up into cylinder bore until seated.

EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL

CAUTION: IT IS ESSENTIAL THAT LOWER CAM IS CORRECTLY POSITIONED IN CYLINDERS PRIOR TO INSTALLING LOWER BEARING.

- R (38) Check for proper seating by attempting to rotate cam using cam replacement tool. Cam will not rotate if lockpins are in cylinder grooves.
- R (39) Measure distance from lower face of cam to lower edge of cylinder. Dimension must not be less than 7-3/4 inches. If dimension is less than 7-3/4 inches, cam has been displaced downward, cam retainer ring is not in groove, and lockpins may have dropped out of cylinder. If cam has been displaced, remove cam retainer ring, and lockpins. Repeat Steps (30) through (39).
- R (40) Install lower seal removal/installation tool assembly (Ref. Fig. 802). Rotate installation bolts to slide lower bearing, spacer, and adapter up piston and into cylinder. Remove tool assembly.
- R (41) Position four segments of split retainer in cylinder recess; space equally (Ref. Fig. 803).
- R (42) Slide retainer, scraper, and retainer ring up into cylinder. Secure retainer ring to each segment of split retainer with washers and bolts. Safety bolts with lock-wire.
- R (43) Reconnect torque arms at apex.
- R (44) Install wheels (Ref. 32-42-01).

WARNING: THE JURY BRACE SPRINGS EXERT A CONSIDERABLE FORCE TO LOCK THE JURY BRACE. RESTRAINT MUST BE PLACED ON THE JURY BRACE IN ORDER TO PREVENT RUNAWAY JURY BRACE LOCKING.

- R (45) If procedure was performed with wheels installed, manually lock gear down and install downlock safety pin.
- R (46) Lower nose with jack (Ref. 7-11-00).
- R (47) Verify that drain plug is installed and secured, and service shock strut (Ref. 12-14-13).
- R (48) Reconnect weight and balance system electrical wiring as follows:

EFFECTIVITY: ALL

32-21-02
Page 814
Jul 15/84



MAINTENANCE MANUAL

- (a) On aircraft 001-014,
connect weight and balance wiring connector at
lower torque arm.
- (a) On aircraft 015-999,
uncoil electrical wires, feed through lower
conduit fitting hole in J-box, and connect
electrical wires to pull-wires.
- (b) Pull wires through J-box and upper conduit.
- (c) Connect lower conduit to upper torque arm J-box
and secure J-box cover.
- (d) Refer to WDM 20-21-01 and connect following
contacts to connector 9811-P886:

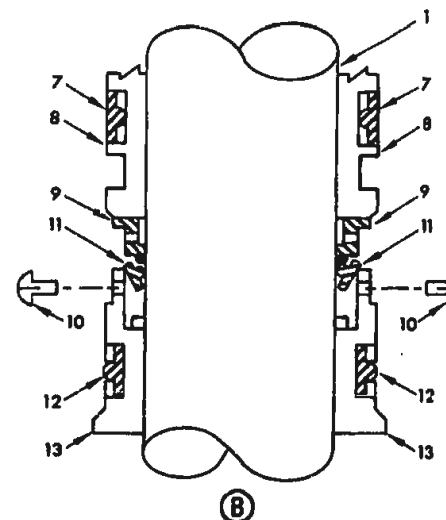
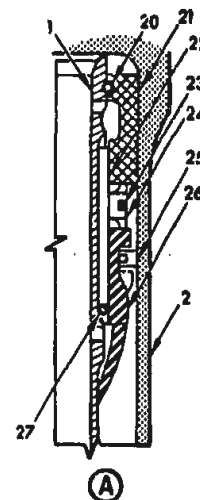
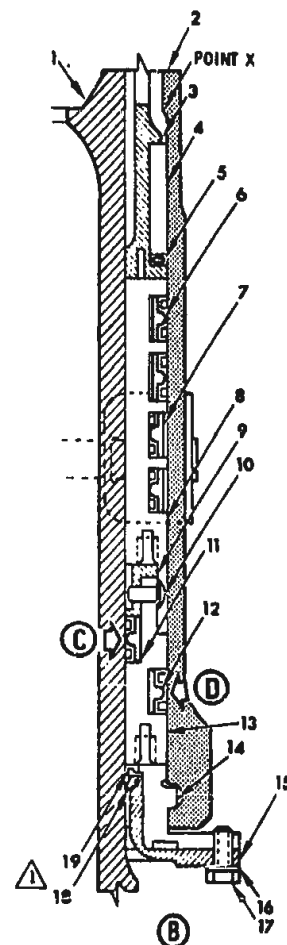
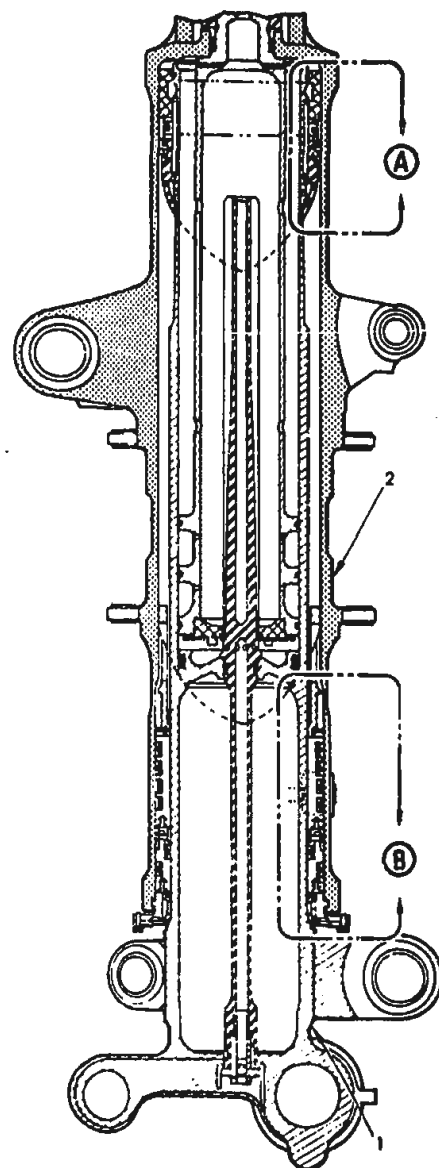
22B (20 GRN)	pin 4	19B (20 GRN)	pin 10
21B (20 WHT)	pin 5	18B (20 WHT)	pin 11
7B (20 BLK)	pin 7	4B (20 BLK)	pin 13
6B (20 RED)	pin 8	3B (20 RED)	pin 14
23E18TU FR1	pin 6	20E18TU FR3	pin 12
8E18TU FR2	pin 9	5E18TU FR4	pin 15
- (e) Connect nose wheel well disconnect to nose wheel
wall aft bulkhead junction box. Safety with
lock-wire.

- R (49) Remove tags and close circuit breakers opened in Step
4E(4).
- R (50) Perform operational test (Ref. 31-41-00).

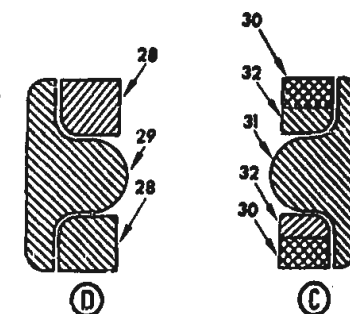
EFFECTIVITY: ALL

001B

32-21-02
Page 815/816
Jul 15/84



ALIGNMENT OF SEAL ASSEMBLY
PRECEDING FINAL ASSEMBLY INTO
ACTIVE (DYNAMIC) SEAL CAVITY



- 1 NLG STRUT PISTON
- 2 NLG STRUT CYLINDER
- 3 LOWER CAM
- 4 LOCKPIN (2)
- 5 RETAINER RING
- 6 SPARE STATIC SEAL SET (2)
- 7 SPARE DYNAMIC SEAL SET (2)
- 8 LOWER BEARING
- 9 SPACER
- 10 PIN (2)
- 11 ACTIVE DYNAMIC SEAL
- 12 ACTIVE STATIC SEAL
- 13 ADAPTER
- 14 SPLIT RETAINER
- 15 RETAINER RING
- 16 WASHER (4)
- 17 BOLT (4)
- 18 SCRAPER
- 19 SCRAPER RETAINER
- 20 UPPER BEARING RETAINER RING
- 21 UPPER BEARING
- 22 LOCKPIN (4)
- 23 GASKET
- 24 SPACER
- 25 EXTENSION DAMPER RING
- 26 UPPER CAM
- 27 UPPER CAM RETAINER RING
- 28 BACKUP RING
- 29 STATIC SEAL
- 30 BLACK BACKUP RING
- 31 DYNAMIC SEAL
- 32 WHITE BACKUP RING

NOTE

⚠ SCRAPER MUST BE INSTALLED WITH FLAT
SIDE UP AND SCRAPER RETAINER MUST
BE INSTALLED WITH FLAT SIDE DOWN

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Nose Landing Gear Spare-to-Active Seal Exchange
Figure 803

EFFECTIVITY: ALL

32-21-02
Page 817/818
Aug 15/82

001B

LOCKHEED
MAINTENANCE MANUAL

NOSE LANDING GEAR UPPER DRAG BRACE - REMOVAL AND INSTALLATION

1. Equipment and Materials

Dry Cleaning Solvent, Fed Spec P-D-680, or equivalent

Cotter Pin, MS 24665-153, or equivalent

Lock-wire, QQ-W-390, 0.032-inch diameter, or equivalent

R Grease, Ref. MM12-20-00, Lubrication, Scheduled Servicing

Low Adhesion Sealing Compound, LAC Spec C-40-769, Type II, or equivalent

Jack Pad Adapters

Forward Fuselage Jack

NLG Drag Brace Center Pin Tool Set, PN B965, or equivalent

Ladder, 8-foot platform, or equivalent

NLG Drag Brace Hoist Adapter, PN B959, or equivalent

Portable Hoist, PN 672523, or equivalent

Nylon strap slings

Engine Run-up Chain Binder, PN BC97-101, or equivalent

2. Referenced Procedures

7-11-00 Wing and Fuselage Jacking - Maintenance Practices

12-24-00 Lubrication

20-51-04 Environmental Sealing of Model L-1011 Airplane
(PB75-425)

29-11-00 Hydraulic Power System - Maintenance Practices

32-21-11 NLG Upper Drag Brace Trunnion Bearings - Removal
and Installation

32-22-01 Nose Landing Gear Forward Door - Adjustment and
Test

32-22-02 Nose Landing Gear Aft Door - Adjustment and Test

EFFECTIVITY: ALL

001B

32-21-03
Page 401
May 15/85

LOCKHEED
MAINTENANCE MANUAL

- 32-30-00** **Landing Gear System Retraction and Extension -
Adjustment and Test**
- 32-37-00** **Landing Gear Mechanical Alternate Extension System
- Maintenance Practices**

3. Removal/Installation

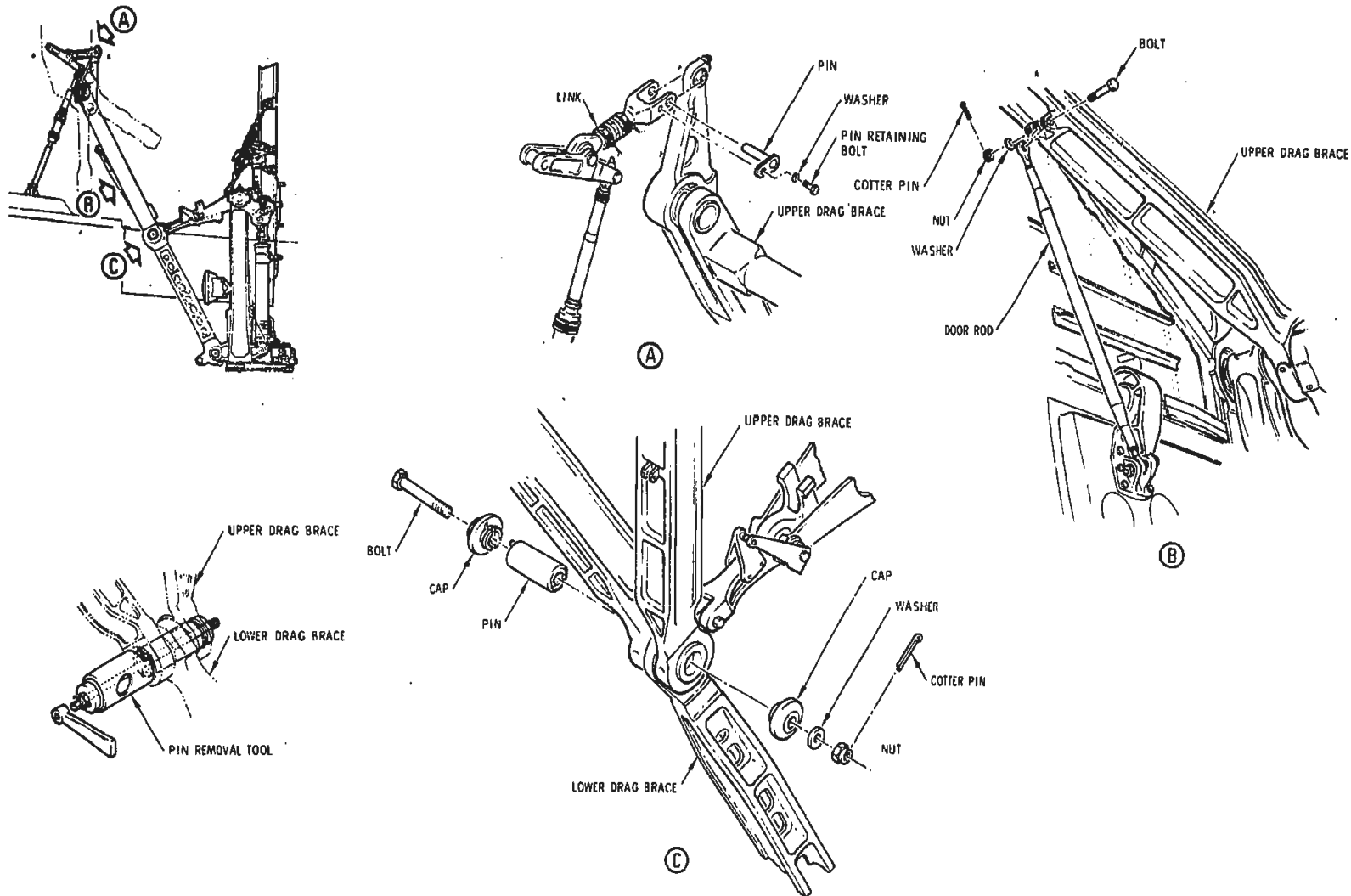
A. Removal

- (1) Chock all main landing gear (MLG) wheels forward and aft. Use chain binders to secure chocks and prevent movement of MLG wheels.
- (2) Verify that downlock safety pins are installed in all three landing gears.
- (3) On pilots center instrument panel, zone 210, tag landing gear control lever in DOWN position to ensure against inadvertent movement.
- (4) Clear area around the aircraft to allow jacking nose landing gear (NLG) from forward fuselage jack point.
- (5) On aircraft 001-006,
open NLG forward doors by pulling manual release at aft end of each door.
- (5) On aircraft 007-999,
open NLG forward doors by pulling manual release at aft end of left door and removing door rod to door disconnect pin on right door.
- (6) Place forward fuselage jack in position and jack aircraft until NLG tire is approximately 3 inches off floor (Ref. 7-11-00).
- (7) Disconnect left and right forward door links from upper drag brace (Ref. Fig. 401, Sheet 1).
- (8) Disconnect left and right aft door rods from upper drag brace.
- (9) Install NLG drag brace hoist adapter in overhead of nosewheel well (Ref. Fig. 401, Sheet 2).
- (10) Position portable hoist and attach nylon strap sling to upper drag brace. Take up hoist cable slack (Ref. Fig. 401, Sheet 3).

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001B

EFFECTIVITY: ALL

32-21-03
Page 402
May 15/82



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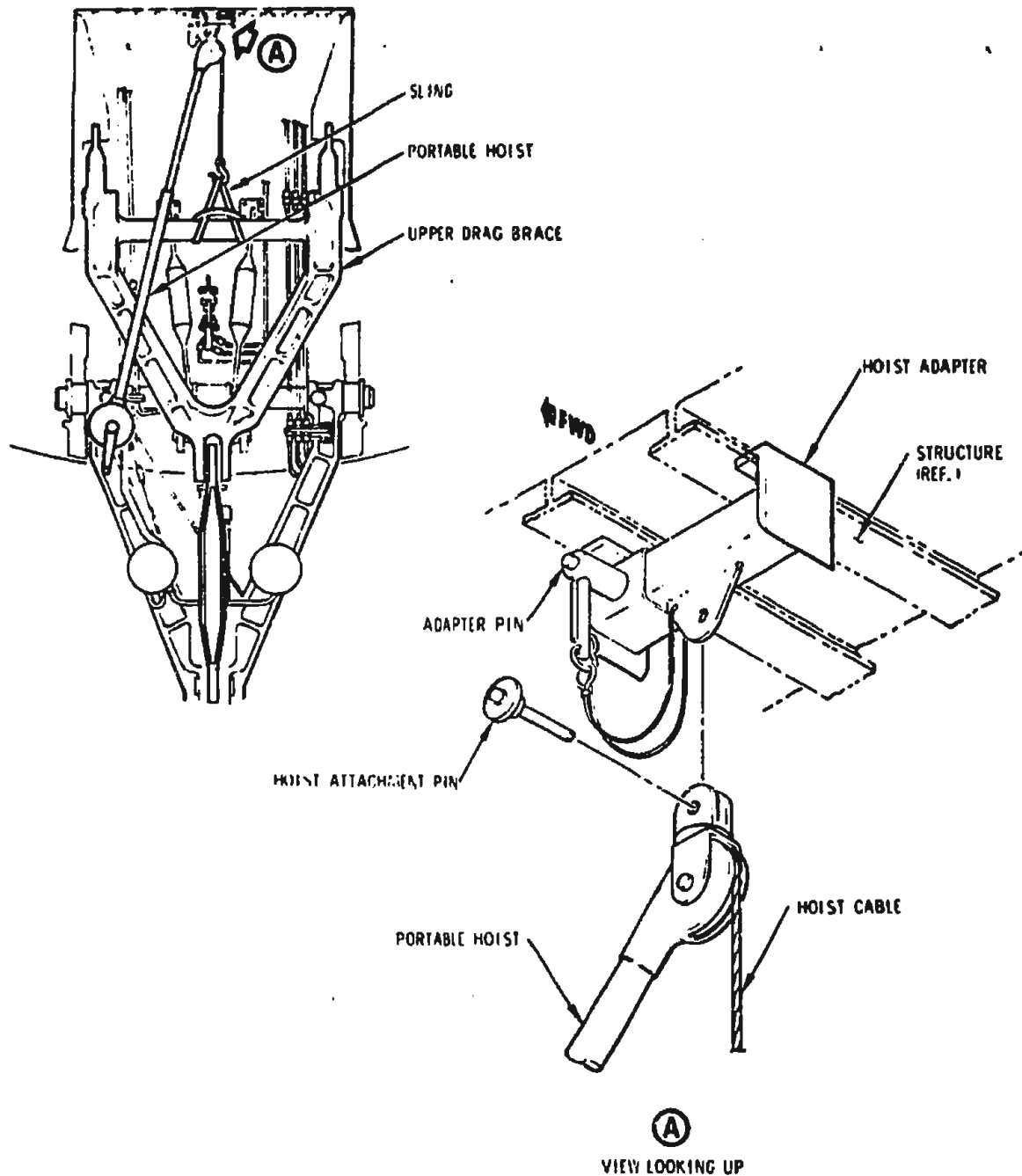
R Nose Landing Gear Upper Drag Brace - Removal and Installation
R Figure 401 (Sheet 1)

EFFECTIVITY: ALL

32-21-03
Page 403/404
Feb 15/74

001B

LOCKHEED
MAINTENANCE MANUAL



M1-0101-32-248

R Nose Landing Gear Upper Drag Brace - Removal and Installation
R Figure 401 (Sheet 2)

EFFECTIVITY: ALL

001B

32-21-03
Page 405
Feb 15/74



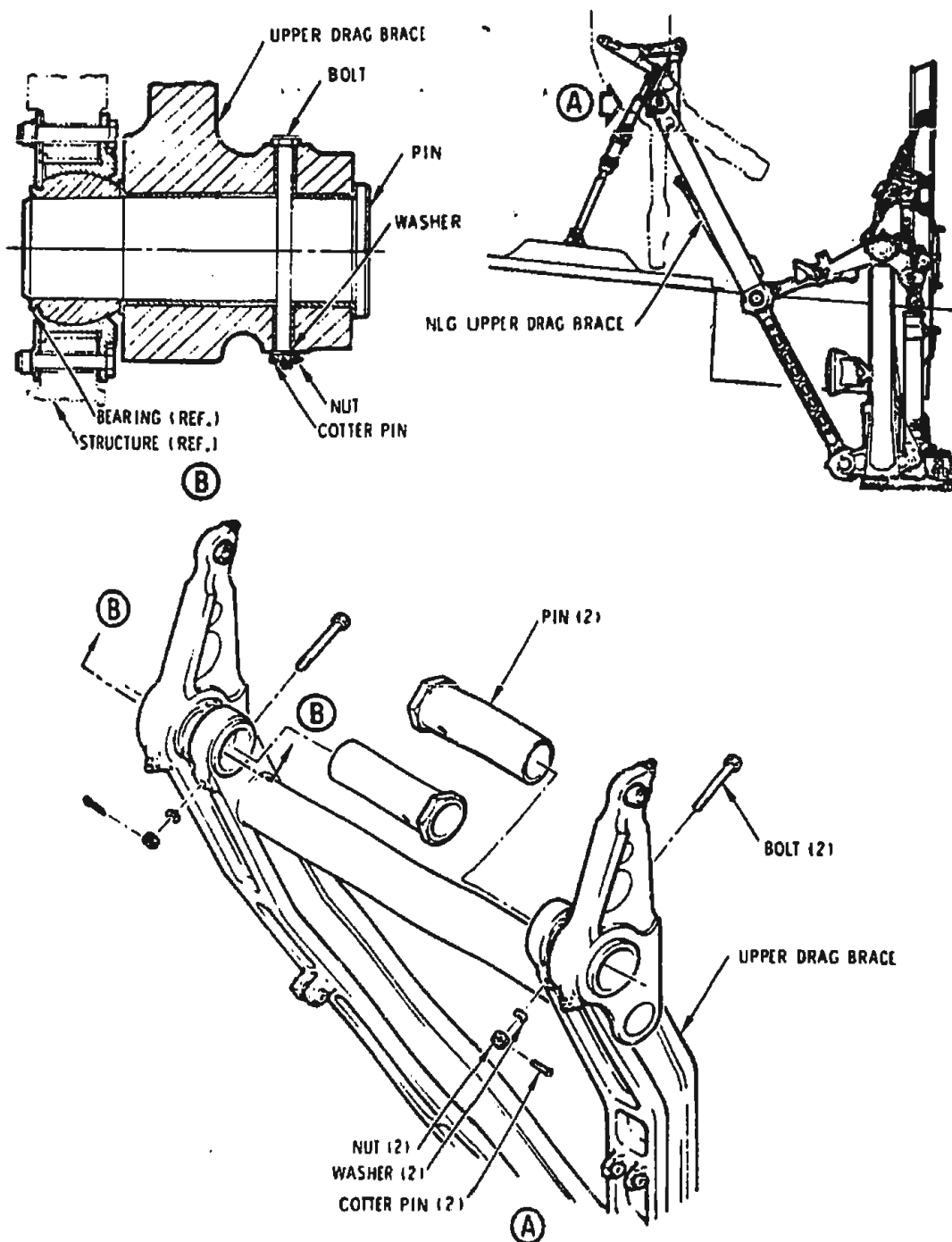
- R
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- (11) Remove drag brace center pin with drag brace center pin tool set (Ref. Fig. 401, Sheet 1). Swing lower end of upper drag brace downward clear of upper end of lower drag brace.
 - (12) Remove left and right trunnion pin retaining bolts (Ref. Fig. 401, Sheet 3).
 - (13) Remove left and right upper drag brace trunnion pins.
 - (14) Lower and remove upper drag brace.
 - (15) Inspect trunnion pin bearings and replace if necessary (Ref. 32-21-11).

B. Installation

- (1) Verify that chocks with chain binders are installed on both MLG, all downlock safety pins are in place, and that landing gear control lever is tagged to prevent inadvertent movement.
- (2) Clean left and right upper drag brace trunnion bearings and drag brace trunnion pin bushings with solvent.
- (3) Coat ID of trunnion pin bushings and trunnion pin bearings with grease. Coat OD of left and right trunnion pins with grease.
- (4) Raise upper drag brace into position with aft door rod attachment lugs facing forward and trunnion pin bushings aligned with trunnion bearings.
- (5) Install left and right trunnion pins with heads inboard.
- (6) Coat left and right trunnion pin retaining bolt with low adhesion sealing compound, (Ref. 20-51-04) and install through drag brace and trunnion pin. Install nuts, washers, and cotter pins.
- (7) Coat ID of center pin bushings and OD of center pin with grease.
- (8) Swing lower end of upper drag brace aft to align center pin bushings with lower drag brace bearing.
- (9) Install center pin, caps, retaining bolt, washer, nut, and cotter pin (Ref. Fig. 401, Sheet 1).

EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL



M1-0101-32-247

R Nose Landing Gear Upper Drag Brace - Removal and Installation
R Figure 401 (Sheet 3)

EFFECTIVITY: ALL

001B

32-21-03
Page 407
Feb 15/74

LOCKHEED
MAINTENANCE MANUAL

R **WARNING:** VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY
HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY
DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL
FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL
AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT
HYDRAULIC PRESSURE.

- (10) Turn on hydraulic system C pressure (Ref. 29-11-00).
- (11) Clear area around NLG in preparation for extension and retraction test.
- (12) Operate NLG only at reduced hydraulic pressure and flow to check for binding or interference (Ref. 32-30-00).
- (13) Connect left and right aft door rods to upper drag brace.
- (14) Connect left and right forward door links. Safety pin retaining bolt with lock-wire.
- (15) Lubricate all joints affected by this procedure (Ref. 12-24-00).
- (16) Perform extension and retraction test of NLG and doors (Ref. 32-30-00).

NOTE: If forward or aft doors rigging is not satisfactory because door links or rods were disturbed, applicable NLG door system adjustment and test procedures must be performed (Ref. 32-22-01 or 32-22-02).

- (17) Perform landing gear alternate mechanical extension (Ref. 32-37-00).
- (18) Lower aircraft and remove jacks (Ref. 7-11-00).
- (19) Remove tag installed in Step 3A(3).

EFFECTIVITY: ALL

001B

32-21-03
Page 408
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL

NOSE LANDING GEAR LOWER DRAG BRACE - REMOVAL AND INSTALLATION

1. Equipment and Materials

Cotter Pin, MS 24665-302, or equivalent

R Grease, Ref. MM12-20-00, Lubrication, Scheduled Servicing

Jack Pad Adapters

Forward Fuselage Jack

Nylon Strap Slings

NLG Drag Brace Center Pin Tool Set, PN B965, or equivalent

Bungee Spring Tool Assembly, PN B698, or equivalent

Engine Run-up Chain Binder, PN BC 97-101, or equivalent

NLG Strut Lock, 1504972-922-MST-1, or equivalent

2. Referenced Procedures

7-11-00 Wing and Fuselage Jacking - Maintenance Practices

10-10-00 Parking - Maintenance Practices

12-24-00 Nose Landing Gear Lubrication

32-30-00 Landing Gear Retraction and Extension - Adjustment
and Test

3. Removal/Installation

A. Removal

- (1) Chock all main landing gear wheels forward and aft.
Use chain binders to secure chocks and prevent movement
of wheels (Ref. 10-10-00).
- (2) Verify that downlock safety pins are installed in all
three landing gears (Ref. 10-10-00).
- (3) On pilots center instrument panel, tag landing gear
control lever in DOWN position to ensure against
inadvertent movement.

EFFECTIVITY: ALL

001B

32-21-04
Page 401
May 15/85

LOCKHEED
MAINTENANCE MANUAL

- (4) Clear area around aircraft to allow jacking from forward fuselage jack point.
- (5) Install NLG strut lock.
- (6) On aircraft 001-006,
open forward doors by pulling manual release at aft end of each door.
- (6) On aircraft 007-999,
open forward doors by pulling manual release at aft end of left door and removing door to door rod disconnect pin on right door.
- (7) Place forward fuselage jack in position and jack aircraft until NLG wheel just clears floor (Ref. 7-11-00).

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- (8) Disconnect left and right forward door links from upper drag brace.

WARNING: TENSION ON EACH JURY BRACE SPRING EXCEEDS 550 POUNDS. USE EXTREME CARE TO ENSURE SPRING RESTRAINT DURING REMOVAL.

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- (9) Install bungee spring tool assembly on left jury brace spring and remove bolts attaching spring to upper jury brace. Repeat this step for right jury brace spring (Ref. Fig. 401).

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- (10) Using NLG drag brace center pin tool set, disconnect upper drag brace from lower drag brace. Secure upper drag brace out of work area. Pad and secure lower drag brace to prevent damage to gear and drag brace (Ref. Fig. 402).

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- (11) Restrain upper drag brace from swinging free when disconnecting from lower drag brace. Use a nylon strap attached to upper drag brace and looped over NLG trunnion tube.

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- (12) Remove nut, bolt, caps, and pin from lower end of upper drag brace.

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- (13) Support lower drag brace and remove nut, bolt, and caps from drag brace center pin. Pull center pin using puller if required. Remove lower drag brace.

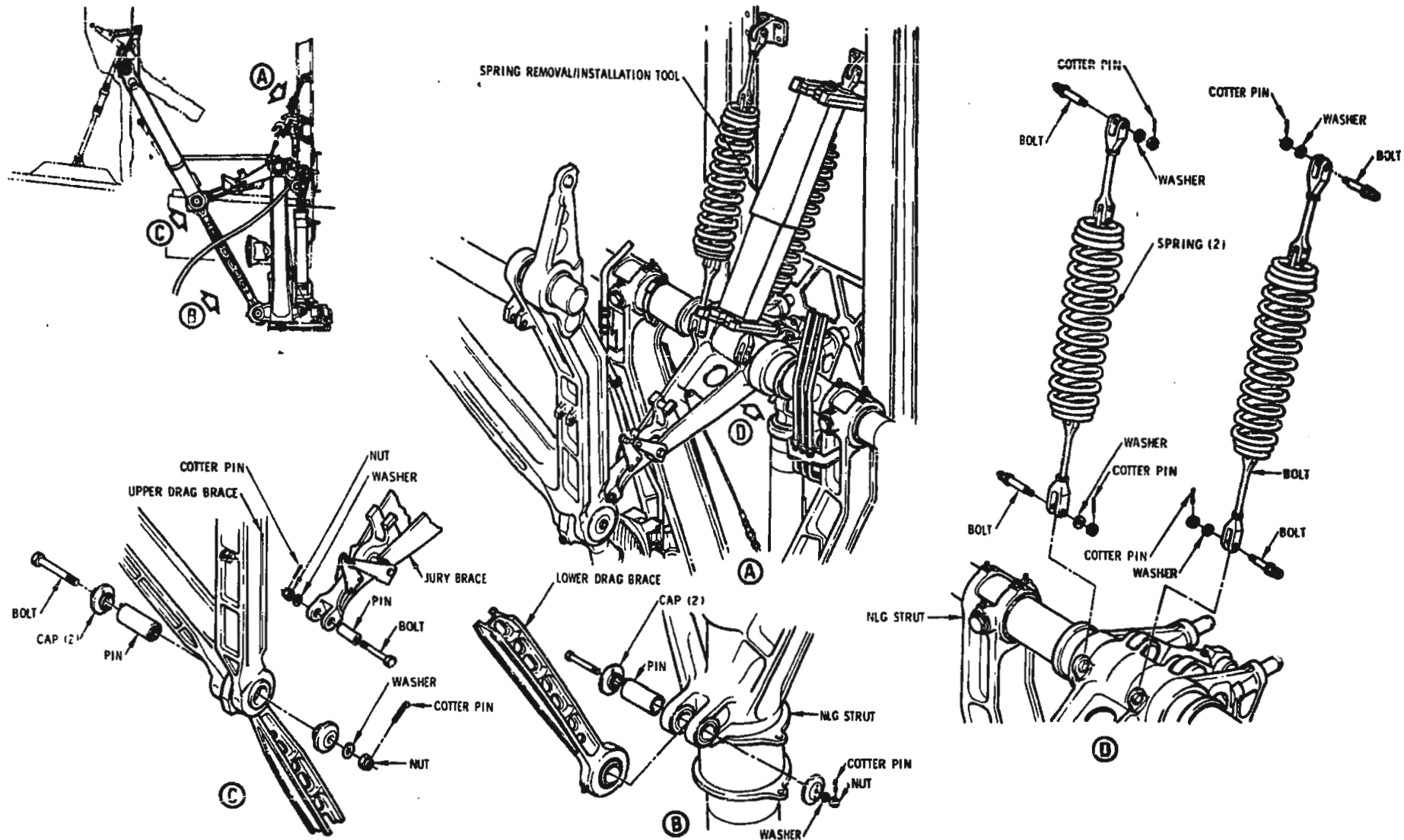
B. Installation

- (1) Verify that all downlock safety pins are installed and that landing gear control lever is tagged.

EFFECTIVITY: ALL

001B

32-21-04
Page 402
May 15/85



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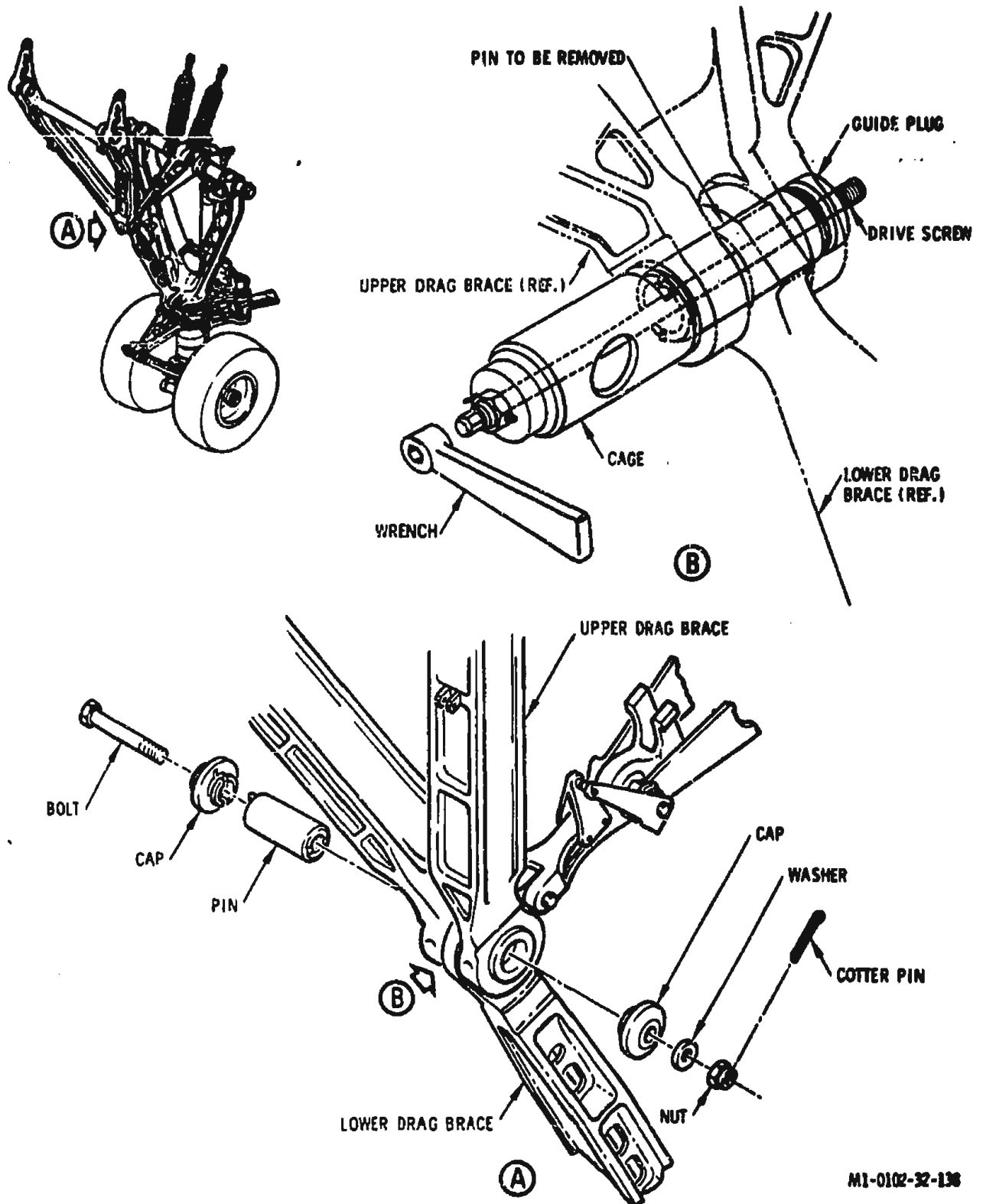
R Nose Landing Gear Lower Drag Brace - Removal and Installation
R Figure 401

EFFECTIVITY: ALL

32-21-04
Page 403/404
Aug 15/78

0018

LOCKHEED
MAINTENANCE MANUAL



M1-0102-32-136

Nose Landing Gear Upper and Lower Drag Brace Disconnects
Figure 402

EFFECTIVITY: ALL

32-21-04
Page 405
May 15/85

R
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001B



MAINTENANCE MANUAL

- (2) Position lower end of lower drag brace between lugs at forward face of shock strut. Align holes for installation of pin and install pin.
- (3) Secure pin in lugs of shock strut with bolt, caps, washer, nut, and cotter pin.
- (4) Pivot lower drag brace to engage lug at upper end with lugs at forward end of lower jury brace.
- (5) Secure lower drag brace to lower jury brace with pin, bolt, caps, washer, nut, and cotter pin.
- (6) Swing lower end of upper drag brace aft to align lugs with lower side brace upper bearing.
- (7) Install drag brace center pin, caps, bolt, washer, nut, and cotter pin.

WARNING: USE EXTREME CARE DURING INSTALLATION TO ENSURE SPRING DOES NOT RELEASE FROM BUNGEE TOOL ASSEMBLY.

- (8) Using bungee spring tool assembly, stretch springs as required and reconnect to upper jury brace.
- (9) Pressure-lubricate all joints affected by this procedure (Ref. 12-24-00).
- (10) Lower aircraft and remove forward fuselage jack (Ref. 7-11-00).
- (11) Remove NLG strut lock.
- (12) Verify strut fill valve is installed and service strut shock struck (Ref. 12-14-13).
- (13) Close forward NLG doors.
- (14) Remove tag from landing gear control lever.
- (15) Perform landing gear retraction and extension (Ref. 32-30-00).

R EFFECTIVITY: ALL
R
001B

32-21-04
Page 406
May 15/85

LOCKHEED
MAINTENANCE MANUAL

NOSE LANDING GEAR UPPER AND LOWER TORQUE ARMS
REMOVAL AND INSTALLATION

1. Equipment and Materials

- R Grease, Ref. MM12-20-00, Lubrication, Scheduled Servicing
Cotter Pin, MS24665-377, or equivalent
Cotter Pin, MS24665-306, or equivalent

2. Removal/Installation

A. Removal of Lower Torque Arm

- (1) Separate upper and lower torque arms at apex as follows:
 - R (a) Disengage safety pin from collar (Ref. Fig. 401).
 - R (b) Support lower torque arm and remove apex pin.
- (2) Remove nut, bolt, and caps securing lower torque arm pin.
- (3) Support lower torque arm and lower torque arm stop link. Remove lower torque arm pin and torque arm from shock strut lugs.

B. Removal of Upper Torque Arm

- (1) Raise upper torque arm until index sleeves center in link.
- (2) Remove bolts securing electrical conduit junction-box to upper torque arm (Ref. Fig. 401). Move conduit assembly out of the work area.
- (3) Remove cotter pin, nut, bolt, and spacers to release upper torque arm from steering collar lugs. Withdraw torque arm from link and lugs.

C. Installation of Lower Torque Arm

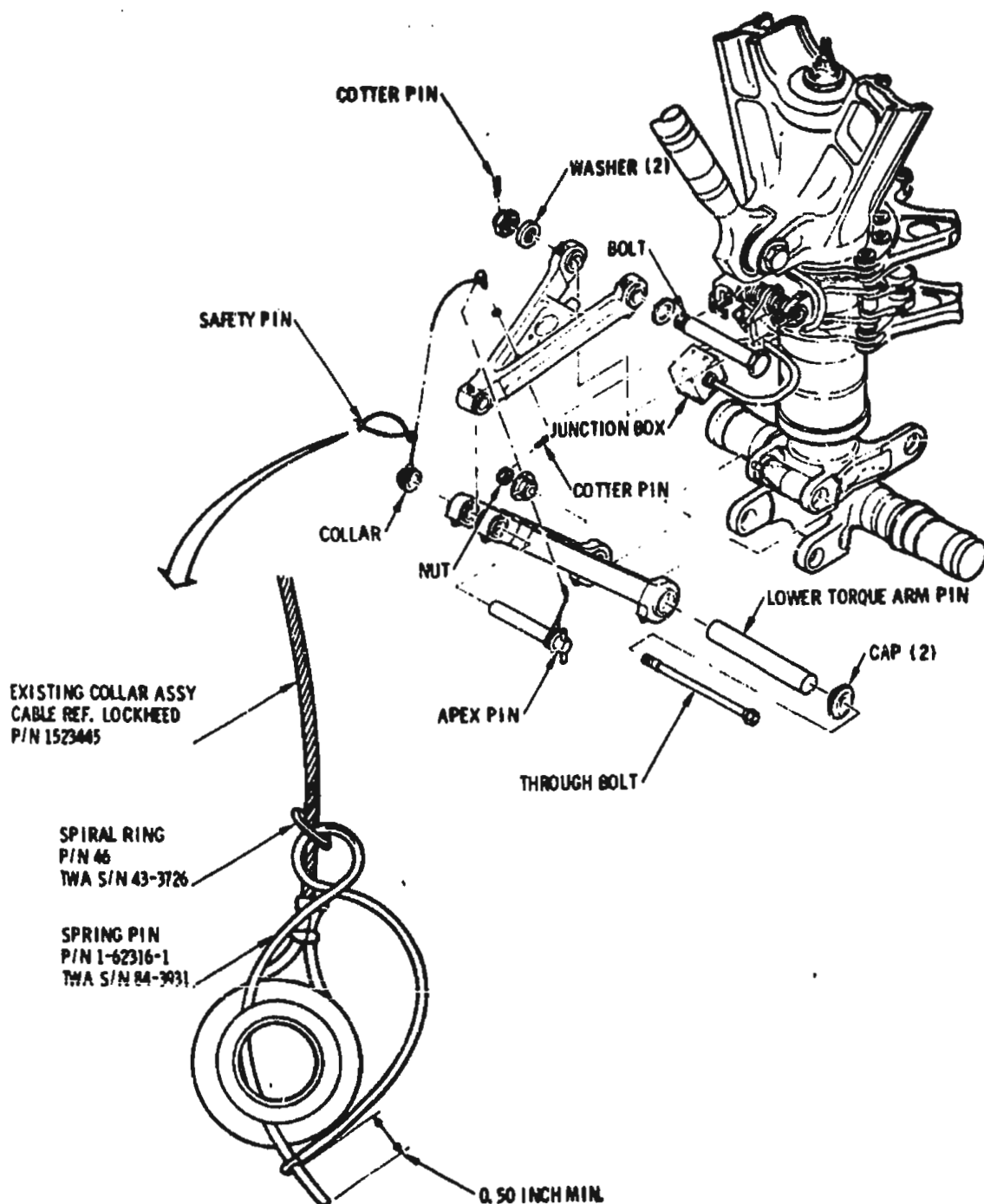
- (1) Coat inside diameter of torque arm bushings shock strut lug bushings, and outside diameter of lower torque arm pin and stop link with grease.

EFFECTIVITY: ALL

001B

32-21-05
Page 401
May 15/85

LOCKHEED
MAINTENANCE MANUAL



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Nose Landing Gear Upper and Lower Torque Arms
Removal and Installation
Figure 401

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EFFECTIVITY: ALL

001B

32-21-05
Page 402
May 15/85



MAINTENANCE MANUAL

- (2) Place torque arm in position (with grease fittings downward) over shock strut lugs and stop link. Install pin, bolt, caps, nut and cotter pin.

R (3) Pressure-lubricate.

D. Installation of Upper Torque Arm

- (1) Coat inside diameter of torque arm bushings, steering collar bushings, and outside diameter of link, and torque arm retaining bolt with grease.

- (2) Place torque arm in position (with grease fittings upward) straddling the steering collar lugs.

- (3) Install torque arm retaining bolt, spacers, nut, and cotter pin.

- (4) Join upper torque arm with lower torque arm by installing apex pin collar and safety cable.

R (5) Install apex pin, collar and safety pin safety cable if
R previously removed.

R (6) Install sensor electrical conduit and junction box.

R (7) Pressure-lubricate.

EFFECTIVITY: ALL

001B

32-21-05
Page 403/404
May 15/85

LOCKHEED
MAINTENANCE MANUAL

R NOSE LANDING GEAR AXLE SHIELD - REMOVAL AND INSTALLATION

1. Removal/Installation

A. Removal

- (1) Remove nuts and washers securing shield to bolts (Ref. Fig. 401).

NOTE: It may be necessary to loosen clamps to allow clearance of bolts in axle shield holes.

- (2) Remove shield.

B. Installation

- (1) Position shield beneath axle so that bolts clipped to clamps protrude through holes in shield.
- (2) Install washers and nuts on bolts.
- (3) Tighten clamps, if loosened during removal.

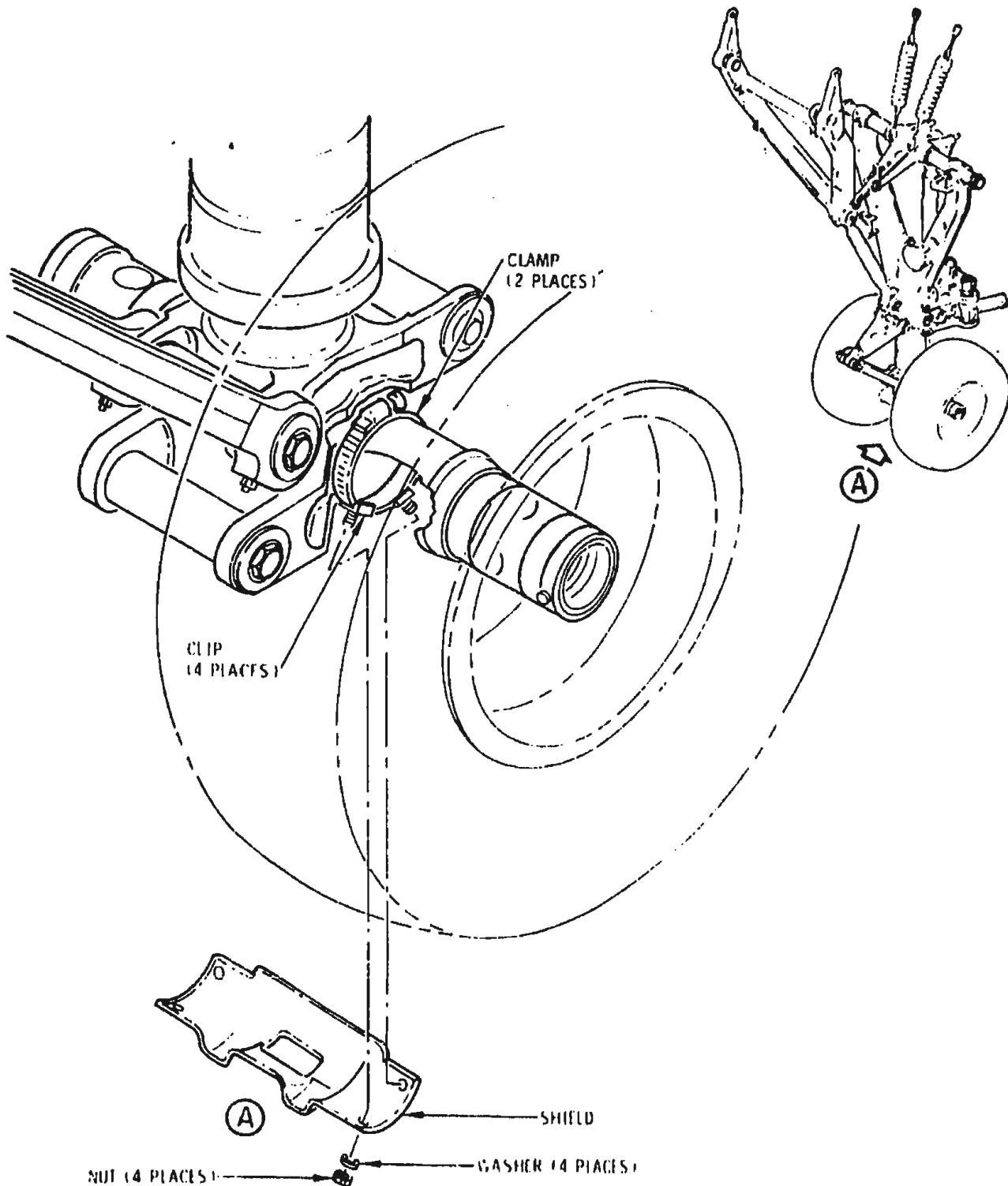
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32-21-09

Page 401
Dec 1/72

LOCKHEED
MAINTENANCE MANUAL



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Nose Landing Gear Axle Shield - Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-21-09
 Page 402
 Apr 1/72

**NOSE LANDING GEAR JURY BRACE SPRINGS - REMOVAL AND INSTALLATION****1. Equipment and Materials**

- R Grease, Ref. MM12-20-00, Lubrication, Scheduled Servicing
Bungee Spring Tool Assembly, PN B698, or equivalent

2. Referenced Procedures

- R 7-11-00 Wing and Fuselage Jacking - Maintenance Practices
12-24-00 Nose Landing Gear Lubrication

3. Removal/Installation**A. Removal**

- (1) Verify that downlock safety pins are installed in all three landing gears (Ref. 10-10-00).
- (2) Jack aircraft at forward fuselage jack point until sufficient weight is on jack to seat jack pads firmly on floor (Ref. 7-11-00).

WARNING: TENSION ON EACH JURY BRACE SPRING EXCEEDS 550 POUNDS. USE EXTREME CARE TO ENSURE SPRING RESTRAINT DURING REMOVAL.

- (3) Install bungee spring tool assembly on left or right jury brace spring assembly (Ref. Fig. 401). Turn screw shaft in direction required to stretch jury brace spring slightly and relieve side load on spring attachment bolts.
- (4) Remove lower spring attachment bolt (Ref. Fig. 401).
- (5) Remove upper spring attachment bolt.
- (6) Remove bungee spring tool assembly and install on remaining jury brace spring assembly.
- (7) Repeat Steps 3A(1) through 3A(6) to remove remaining spring.

B. Installation

EFFECTIVITY: ALL

001B

32-21-10
Page 401
May 15/85



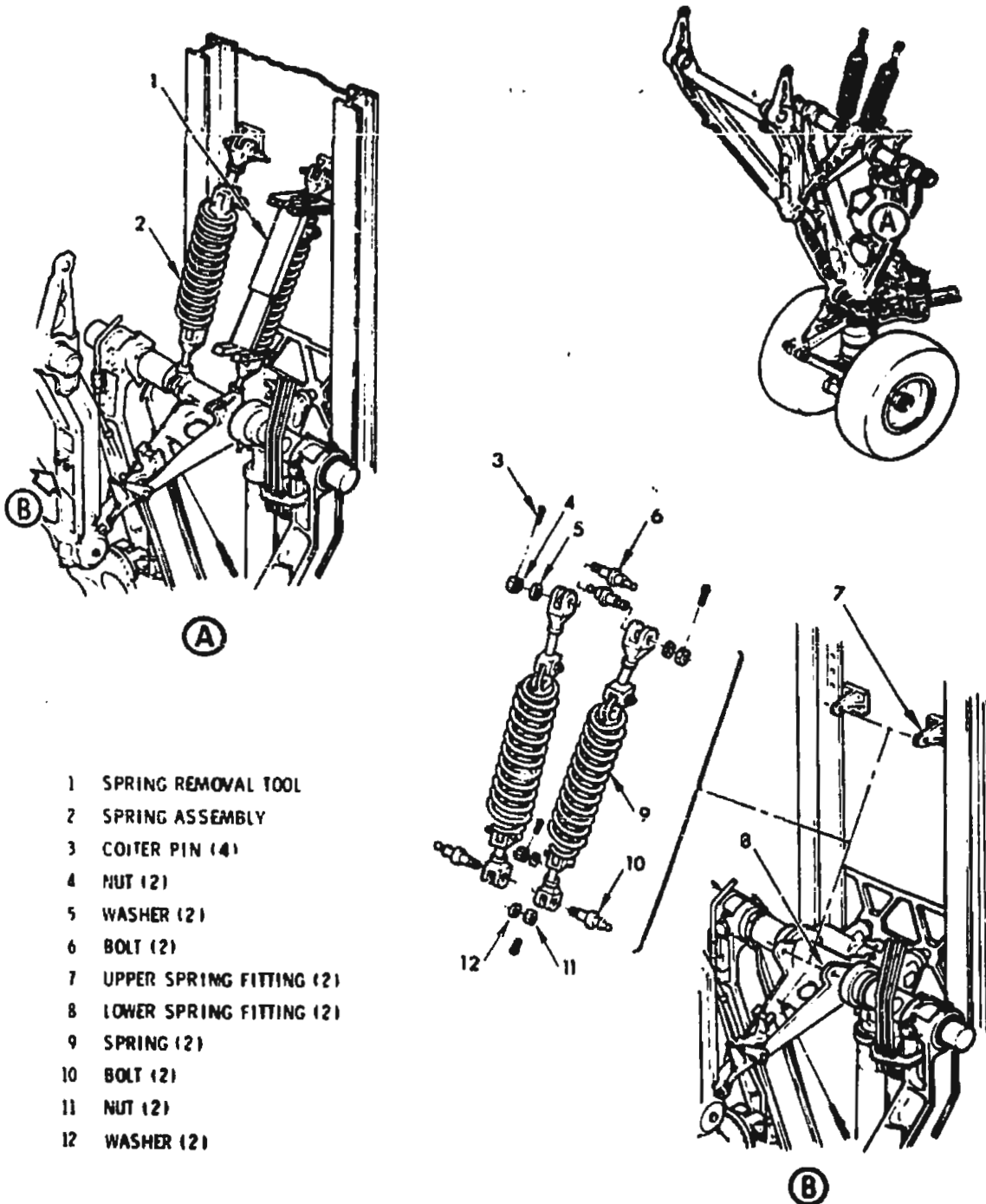
MAINTENANCE MANUAL

- (1) Install bungee spring tool assembly on jury brace spring (Ref. Fig. 401).
- (2) Coat inside diameter of spring attachment lugs and fittings and outside diameter of upper and lower spring retaining bolts with grease.
- (3) Install upper retaining bolt, nut, and cotter pin (Ref. Fig. 401). Install with grease fittings toward center line of wheel well.

WARNING: USE EXTREME CARE DURING INSTALLATION TO ENSURE SPRING DOES NOT RELEASE FROM BUNGEE TOOL ASSEMBLY.

- (4) Stretch spring with bungee spring tool assembly until lower retaining bolt may be installed by hand.
- (5) Install lower retaining bolt, nut, and cotter pin (Ref. Fig. 401). Install bolt with grease fitting pointing away from wheel well centerline.
- (6) Repeat Steps 3B(1) through 3B(5) for remaining spring.
- (7) Remove bungee spring tool assembly.
- (8) Pressure-lubricate upper and lower retaining bolts (Ref. 12-24-00).
- (9) Lower aircraft and remove forward fuselage jack (Ref. 7-11-00).

LOCKHEED
MAINTENANCE MANUAL



M1-0102-32-257

R Nose Landing Gear Jury Brace Springs - Removal and Installation
R Figure 401

EFFECTIVITY: ALL

32-21-10
Page 403/404
Aug 15/78

001B

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MAINTENANCE MANUAL

NLG UPPER DRAG BRACE TRUNNION BEARING - REMOVAL AND INSTALLATION

1. General

This procedure provides instructions for removal and installation of one NLG upper drag brace trunnion bearing. The opposite bearing is removed and installed in an identical manner. These bearings are accessible only upon removal of the upper drag brace.

2. Equipment and Materials

Low Adhesion Sealing Compound, Products Research Co.,
PR1301HT-K, LAC C-40-769A, or equivalent

3. Referenced Procedures

20-51-04 Environmental Sealing of Model L-1011 Airplane
 (PB75-425)

20-71-01 Lockheed Overhaul Manual, Bearing Installation and
Retention

32-21-03 Nose Landing Gear Upper Drag Brace - Removal and
Installation

4. Removal/Installation

A. Removal

(1) Remove NLG upper drag brace (Ref. 32-21-03).

(2) Locate upper drag brace trunnion bearing and retainer on inboard wall of applicable environmental control system (ECS) compartment (Ref. Fig. 401).

(3) With one person stationed inside NLG wheel well to prevent rotation of retaining bolts, remove nuts and washers from bearing retainer.

(4) Remove bearing retainer and shims (Ref. Fig. 402).

NOTE: Removal of ducting from within ECS compartment may ease removal of retainer and shims.

(5) From inside NLG wheel well, remove retaining bolts, bearing, and shims (Ref. Fig. 402).

EFFECTIVITY: ALL

32-21-11
Page 401
Aug 15/82

LOCKHEED
MAINTENANCE MANUAL

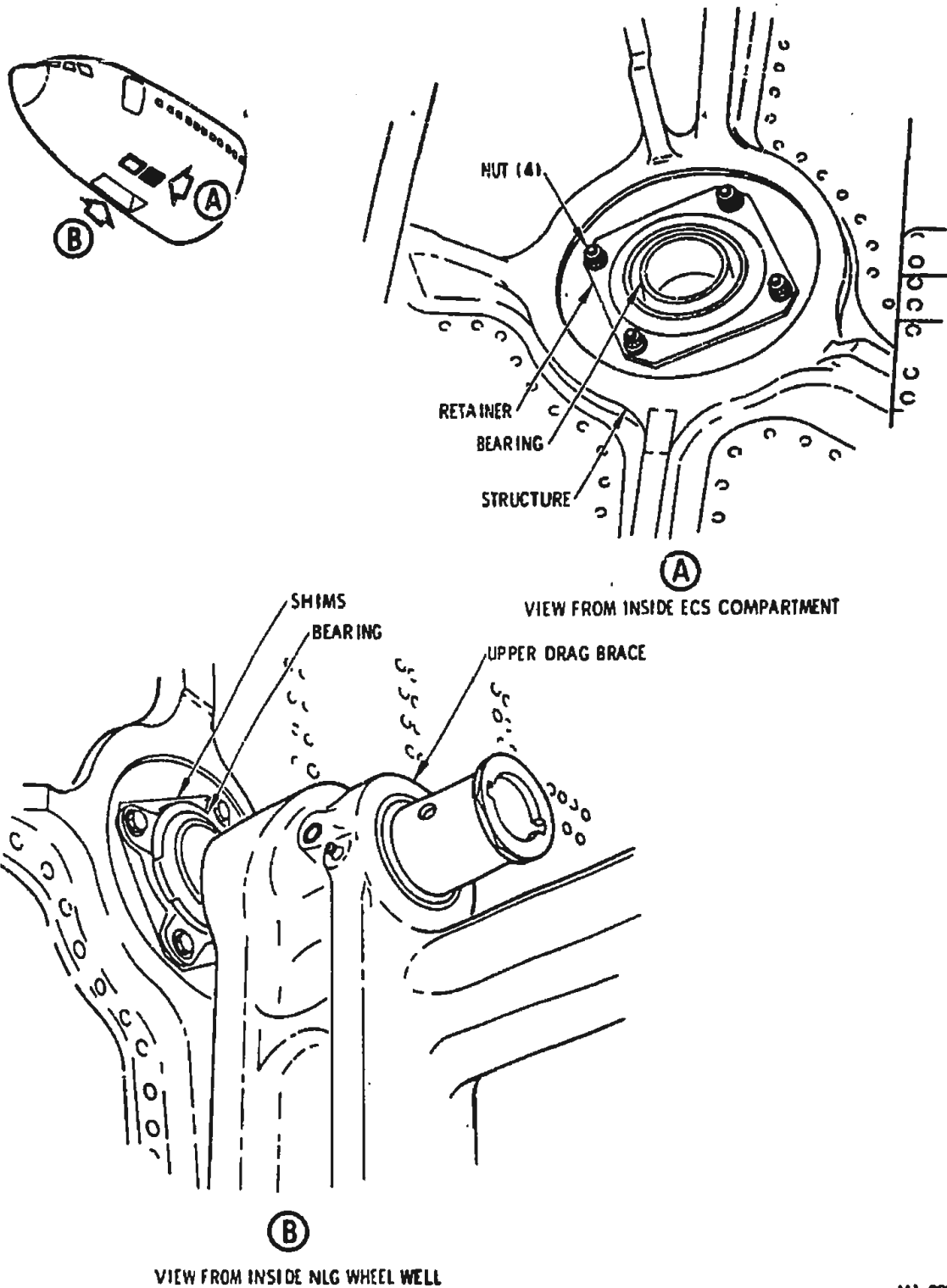
B. Installation

- R (1) Prepare NLG upper drag brace trunnion bearing for
R installation (Ref. OHM, 20-71-01).
- R (2) Place four shims under bearing flange and insert
R bearing into aircraft web assembly bore. Place four
R shims and retainer in position in ECS compartment (Ref.
R Fig. 402).
- R (3) Inside NLG wheel well, measure distance from spherical
R bearing face to opposite spherical bearing face.
R Distance must be $41.230 \pm .010$ inches. Add or remove
R shims from under bearing flange as necessary to achieve
R required distance.
- NOTE: Shims removed from under bearing flange must be
relocated under bearing retainer. Shims added
under bearing flange must be taken from under
retainer.
- R (4) When required distance has been achieved, coat
R retaining bolts with low adhesion sealing compound
R (Ref. 20-51-04) and install with bolt threads facing
R outboard.
- R (5) Install washers and nuts. Torque nuts 195 ± 10 pound -
R inches.
- R (6) Install NLG upper drag brace (Ref. 32-21-01).

0018 EFFECTIVITY: ALL

32-21-11
Page 402
Aug 15/82

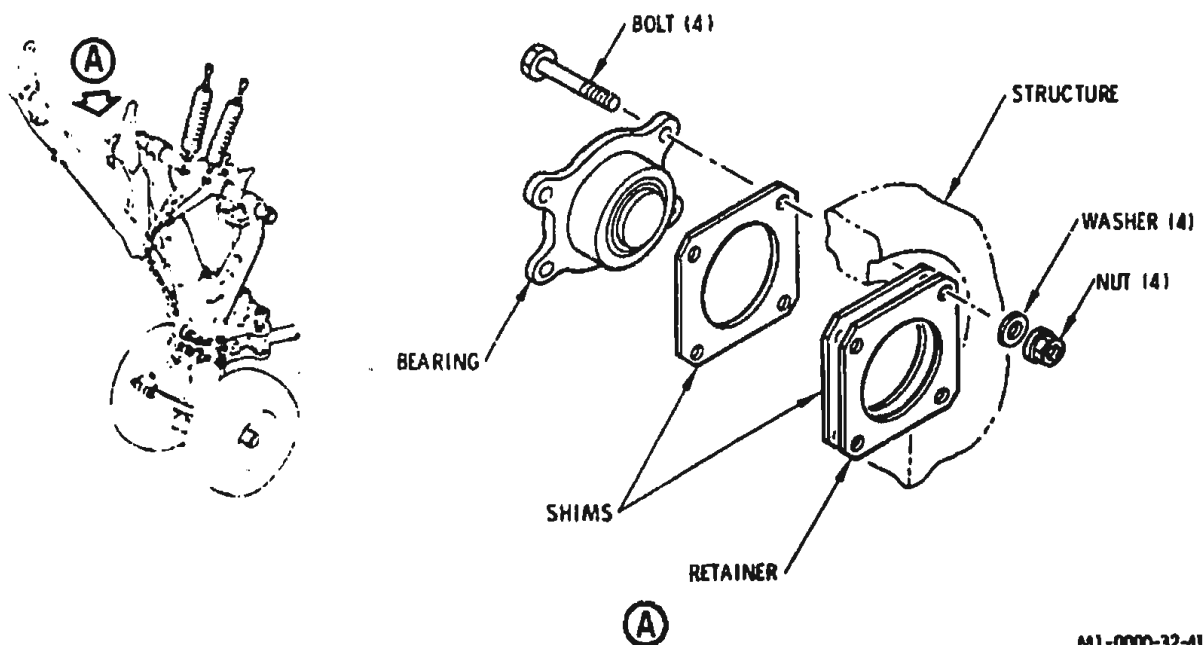
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MAINTENANCE MANUAL



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NLG Upper Drag Brace Trunnion Bearing Location
Figure 401

LOCKHEED
MAINTENANCE MANUAL



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R NLG Upper Drag Brace Trunnion Bearing Removal and Installation
R Figure 402

R EFFECTIVITY: ALL
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001B

32-21-11
Page 404
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL

R NLG SHOCK STRUT TRUNNION BEARING- REMOVAL AND INSTALLATION

R 1. General

R This procedure provides instructions for removal and
R installation of one NLG shock strut trunnion bearing. The
R opposite bearing is removed and installed in an identical
R manner. These bearings are accessible only upon removal of the
R complete Nose Landing Gear assembly.

R 2. Equipment and Materials

R Low Adhesion Sealing Compound, Products Research Co.,
R PR1301HT-K, LAC C-40-769A, or equivalent.

R 3. Referenced Procedure

R 20-51-04 Environmental Sealing of Model L-1011 Airplane
R (PB75-425)

R 20-71-01 Lockheed Overhaul Manual, Bearing Installation and
R Retention

R 32-21-01 Nose Landing Gear Assembly - Removal and
R Installation

R 4. Removal/Installation

R A. Removal

- R (1) Remove NLG assembly (Ref. 32-21-01).
- R (2) Locate NLG shock strut bearing on inboard wall of
R applicable environmental control system (ECS)
R compartment.
- R (3) With one person stationed inside NLG wheel well to
R prevent rotation of retaining bolts, remove nuts and
R washers.
- R (4) Remove bearing.
- R NOTE: Removal of ducting from within ECS compartment
R may ease removal of bearing.
- R (5) From inside NLG wheelwell, remove retaining bolts.

R EFFECTIVITY: ALL
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001B

32-21-12
Page 401
Aug 15/82



R B. Installation

- R (1) Prepare NLG shock strut trunnion bearing for
R installation (Ref. OHM, 20-71-01).
- R (2) Insert bearing into aircraft web assembly bore.
- R (3) Coat retaining bolts with low adhesion sealing compound
R (Ref. 20-51-04) and install with bolt threads facing
R outboard.
- R (4) Install washers and nuts. Torque nuts 465-510 pound -
R inches.
- R (5) Install NLG assembly (Ref. 32-21-01).



NOSE WHEEL SPIN BRAKE ASSEMBLY - REMOVAL AND INSTALLATION

1. Referenced Procedure

10-10-00 Parking - Maintenance Practices

2. Removal/Installation

A. Removal

- (1) Verify that downlock safety pins are installed (Ref. 10-10-00).
- (2) Remove bolts securing brake assembly to support arm (Ref. Fig. 401).
- (3) Remove brake assembly.

B. Installation

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NOTE: When replacing the spin brake pad for wear in the nose wheel well of the L-1011-drill new hole per ER32-112 to realign the pad on the support arm for more uniform wear. The pad can be rotated 180° per ER32-112 to wear the opposite end of an unevenly worn pad for a salvage cost saving.

- (1) If brake assembly Part No. 1550614-101 (two holes) is being installed, proceed as follows:
 - (a) Position brake assembly on outboard side of support arm.
 - (b) Secure brake assembly to support arm with bolt, washers, and nut.
- (2) If brake assembly Part No. 1550614-113 (one hole) is being installed, proceed as follows:
 - (a) Secure brake assembly to support arm with one bolt, washers, and nut (Ref. Fig. 401).
 - (b) Position assembly 2.5 (±0.5) degrees (Ref. View B or C).
 - (c) Scribe hole center in assembly picking up existing hole in support arm.

EFFECTIVITY: ALL

001B

32-21-15

Page 401
Aug 15/81



M1-0003-32-468

Nose Wheel Spin Brake Assembly - Removal and Installation

Figure 401

32-21-15
Page 402
May 15/82

LOCKHEED



MAINTENANCE MANUAL

- (d) Drill 0.198/0.204 (No. 8) inch hole through assembly.
- (e) Secure brake assembly to support arm with two bolts, washers, and nuts.

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MAINTENANCE MANUAL

NOSE LANDING GEAR AXLE SLEEVE - REMOVAL AND INSTALLATION

1. Equipment and Materials

Nose Landing Gear Bearing Sleeve Puller Set, PN BA30 (1302780), or equivalent

High capacity heat lamps, or equivalent

Oven, capacity to insert axle sleeve, capable of 300 degrees Fahrenheit (150 degrees Centigrade), or equivalent

Dry ice, sufficient to pack axle bore, or equivalent

R Grease, Ref. MM12-20-00, Lubrication, Scheduled Servicing

2. Referenced Procedure

32-42-01 Nose Landing Gear Wheel and Tire Assembly - Removal and Installation

3. Removal/Installation

A. Removal

- (1) Remove wheel and tire assembly from applicable axle end (Ref. 32-42-01).

WARNING: DRY ICE CAN CAUSE SEVERE DAMAGE TO SKIN IF CONTACT IS MADE. EXTREME CARE MUST BE EXERCISED TO AVOID DIRECT CONTACT BETWEEN SKIN AND DRY ICE.

- (2) Pack axle bore with dry ice or equivalent cooling medium. Allow approximately 15 minutes to chill axle.

CAUTION: AXLE SLEEVE TEMPERATURE MUST NOT EXCEED 300 DEGREES FAHRENHEIT (149 DEGREES CENTIGRADE) DURING HEATING PROCESS.

- (3) Heat axle sleeve with heat lamps or equivalent heating device for approximately 5 minutes while maintaining dry ice chilling of axle.

WARNING: HEAT PROTECTIVE GLOVES OR EQUIVALENT HANDLING DEVICES MUST BE USED DURING SLEEVE REMOVAL.

- (4) Install sleeve puller to axle and sleeve (Ref. Fig. 401).

EFFECTIVITY: ALL

001B

32-21-16
Page 401
May 15/85



(5) Using sleeve puller, remove sleeve from axle.

B. Installation

R **WARNING:** DRY ICE CAN CAUSE SEVERE DAMAGE TO SKIN IF CONTACT IS MADE. EXTREME CARE MUST BE EXERCISED TO AVOID DIRECT CONTACT BETWEEN SKIN AND DRY ICE.

- (1) Coat axle surfaces where sleeve will bear with a thin application of grease.
- (2) Pack axle bore with dry ice or equivalent cooling medium. Allow approximately 15 minutes to chill axle.

R **CAUTION:** AXLE SLEEVE TEMPERATURE MUST NOT EXCEED 300 DEGREES FAHRENHEIT (149 DEGREES CENTIGRADE) DURING HEATING PROCESS.

- (3) Heat axle sleeve in oven or equivalent heating device to a maximum temperature of 300 degrees Fahrenheit (149 degrees centigrade).

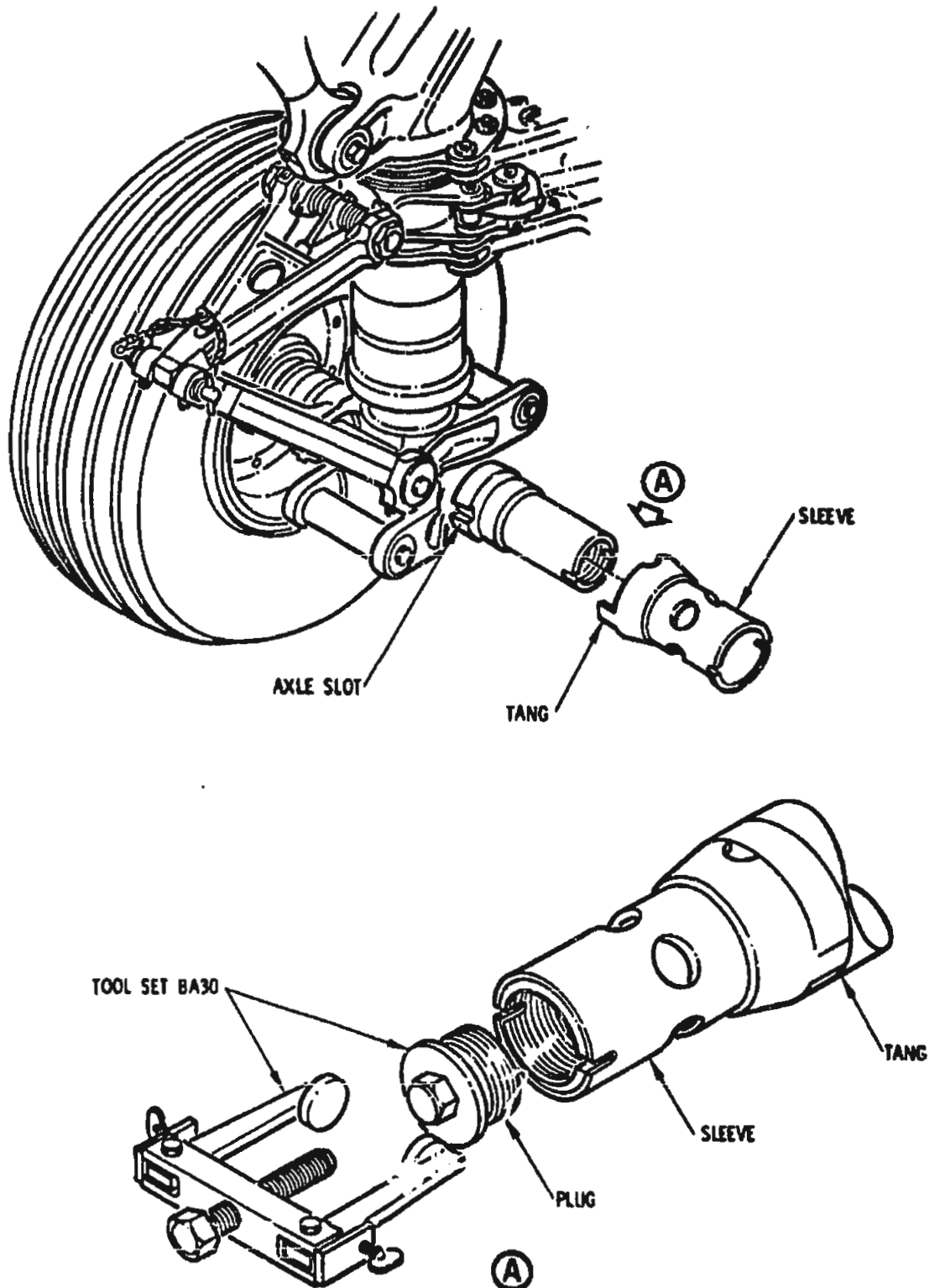
R **WARNING:** HEAT PROTECTIVE GLOVES OR EQUIVALENT HANDLING DEVICES MUST BE USED DURING SLEEVE INSTALLATION.

- (4) Remove sleeve from oven, align sleeve tang with axle slot and slide sleeve onto axle before sleeve cools and shrinks back to original size.
- (5) Ensure that inner end of sleeve is in full contact with axle flange.
- (6) Remove any residual dry ice and allow sufficient time for axle to return to ambient temperature.
- (7) Install wheel and tire assembly (Ref. 32-42-01).

001B EFFECTIVITY: ALL

32-21-16
Page 402
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-996

Nose Landing Gear Axle Sleeve - Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-21-16
Page 403/404
May 15/76

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LOCKHEED
MAINTENANCE MANUAL

R NOSE LANDING GEAR FORWARD DOOR - REMOVAL AND INSTALLATION

1. Equipment and Materials

Cold-application, Solvent Cutback, Corrosion Preventive Compound, MIL-C-16173, Grade 4, or equivalent

Low Adhesion Sealing Compound, LAC Spec C-40-769, Type I, or equivalent

Integral Fuel Tank Sealing Compound, LAC Spec LCM40-2180, or equivalent

2. Referenced Procedures

- | | |
|----------|---|
| 20-12-01 | Application of Corrosion Preventive Materials (LCP 78-1128) |
| 20-51-04 | Environmental Sealing of Model L-1011 Airplane (PB75-425) |
| 28-11-00 | Tanks - Maintenance Practices |
| 32-22-01 | Nose Landing Gear Forward Door - Adjustment and Test |
| 32-30-00 | Landing Gear Retraction and Extension - Adjustment and Test |

3. Removal/Installation

A. Removal

- (1) On aircraft 001-006,
open both forward NLG doors by pulling manual release at the rear of each door (Ref. Fig. 401).
- (1) On aircraft 007-999,
open left forward NLG door by pulling manual release at rear of door. Open right forward NLG door by removing quick release pin (Ref. Fig. 401).
- (2) Disconnect bonding jumper at each end of door to be removed.
- (3) Disconnect manual release cable at door rod.
- (4) Disconnect door rod from door.

EFFECTIVITY: ALL

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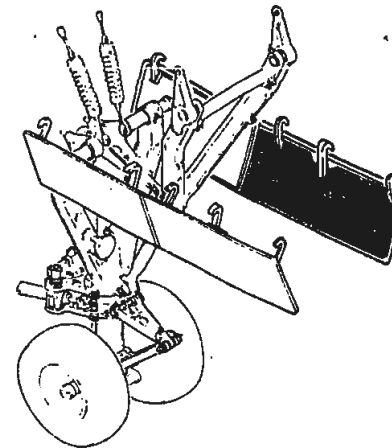
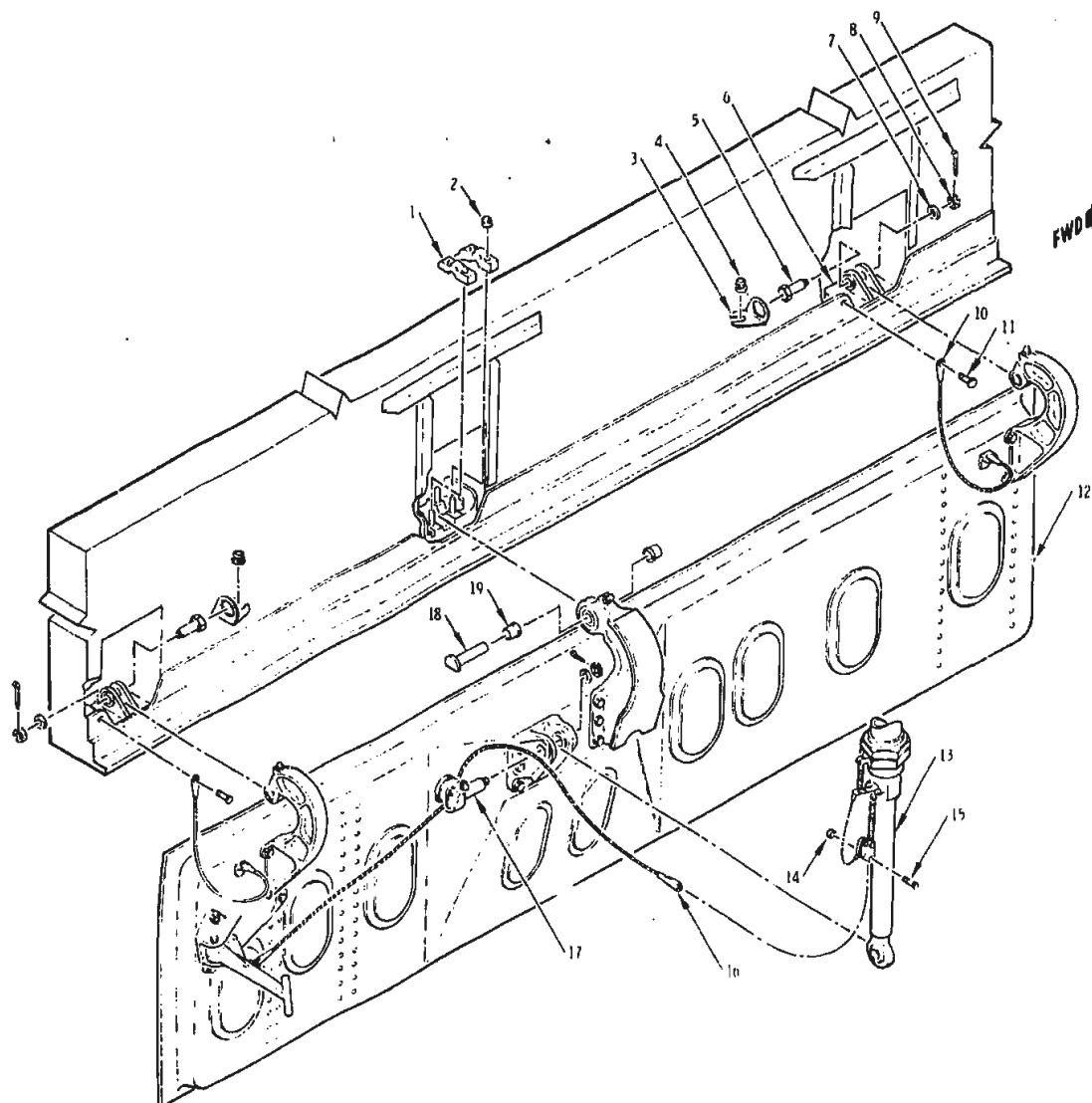
32-22-01
Page 401
Nov 15/85

LOCKHEED
MAINTENANCE MANUAL

- (5) Support door and remove nuts from center hinge pin retaining block over center hinge pin.
- (6) Remove hinge bolts from front and rear hinge.
- (7) Remove door.

B. Installation

- (1) Install center hinge pin in door hinge with antirotation flat on head aligned with nesting groove in fuselage hinge half.
- (2) Position door and align door hinge points to fuselage hinge halves (Ref. Fig. 401). Install front and rear hinge bolts, washers, and nuts. Coat threads of nuts with low adhesion sealing compound (Ref. 20-51-04) and install. Install cotter pins.
- (3) Coat hinge pin retainer to hinge faying surfaces with cold-application, solvent cutback, corrosion preventive compound (Ref. 20-12-01) and install retainer holddown nuts.
- (4) Connect door rod, manual release cable, and bonding jumpers.
- (5) Fillet seal both ends of bonding jumper with integrel fuel tank sealing compound (Ref. 28-11-00).
- (6) On aircraft 001-006,
close both doors with a force of approximately 40 pounds, then pull down on each door with a load of 50 to 100 pounds to verify that release has reset and positively holds doors closed.
- (6) On aircraft 007-999,
close right door and install quick release pin. Close left door with a force of approximately 40 pounds, then pull down on each door with a load of 50-100 pounds to verify that release has reset and positively holds door closed.
- (7) Perform nose landing gear forward door adjustment and test (32-22-01).
- (8) Perform landing gear retraction and extension (Ref. 32-30-00).



NOTE

- 1 HINGE PIN RETAINING BLOCK (2 PLACES)
- 2 NUT (4 PLACES)
- 3 LOCK (2 PLACES)
- 4 NUT (2 PLACES)
- 5 BOLT (2 PLACES)
- 6 FORWARD HINGE
- 7 WASHER (2 PLACES)
- 8 NUT
- 9 COTTER PIN (2 PLACES)
- 10 BONDING JUMPER
- 11 SCREW
- 12 NLG FORWARD DOOR
- 13 DOOR ROD ASSEMBLY
- 14 NUT
- 15 BOLT
- 16 MANUAL RELEASE CABLE
- 17 PULLEY ASSEMBLY
- 18 HINGE PIN
- 19 BUSHING (2 PLACES)

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R R Nose Landing Gear Forward Door - Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-22-01
Page 403/404
Dec 1/72

001B

LOCKHEED
MAINTENANCE MANUAL

NOSE LANDING GEAR FORWARD DOOR - ADJUSTMENT AND TEST

1. General

Adjustment of the nose landing gear (NLG) forward door involves adjustment of the door rods, door mechanism adjustable links and aft door stops if applicable.

2. Equipment and Materials

Jack Pad Adapters

Lockwire, QQ-W-390, Temp A, 0.050-inch diameter, or equivalent
Forward Fuselage Jack

3. Referenced Procedures

7-11-00	Wing and Fuselage Jacking - Maintenance Practices
24-00-00	Electrical Power - Maintenance Practices
29-11-00	Hydraulic Power System - Maintenance Practices
32-33-00	Main Landing Gear Inboard Door - Maintenance Practices

4. Adjustment/Test

C NOTE: BACK OFF ADJUSTABLE STOP BOLTS BEFORE STARTING (IF
C INSTALLED).

A. Adjustment

- R
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- (1) Install NLG and main landing gear (MLG) downlock safety pins. Pull D-handles to open both MLG inboard doors, install door actuator locks (Ref. 32-33-00), and restow D-handles.
 - (2) Jack aircraft at fuselage jack point to a height that will permit retraction and extension of nose landing gear (Ref. 7-11-00).
 - (3) Adjust door rod to 40.80 (± 0.10) inches measured between centerlines of rod-end bearings (Ref. Fig. 501).

EFFECTIVITY: ALL

32-22-01
Page 501
May 15/89

001B



MAINTENANCE MANUAL

- (4) Adjust left turnbuckle link to 9.70 (± 0.03) inches; adjust right turnbuckle length to 9.60 (± 0.030) inches measured between centerlines of rod-end pins (Ref. Fig. 501).

NOTE: The adjustment of dimensions called out in Steps 4A(3) and 4A(4) are initial adjustment approximations and may require change during following adjustment procedures.

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

MAIN LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (5) Verify that LANDING GEAR control lever is in DOWN position and turn on hydraulic system C pressure (Ref. 29-11-00). Use a flow-rate controllable hydraulic pressure source, and set rate for slow retraction and extension of nose landing gear (approximately 3 gpm).
- (6) Turn on electrical power (Ref. 24-00-00).
- (7) With NLG in down position, measure distance between leading edge of door and door stop (Ref. Fig. 501). Record this dimension as X.
- (8) Remove NLG downlock safety pin, ensure that NLG and MLG door areas are clear of personnel and equipment, and then retract NLG.
- (9) Measure distance between door leading edge and door stop (Ref. Fig. 501). Record this dimension as Y.
- (10) Subtract Y from X. The result must be 3.20 inches to 3.30 inches.

NOTE: If X-Y is less than 3.20 inches, the turnbuckle is to be lengthened. If X-Y is more than 3.30 inches, the turnbuckle is to be shortened.

To adjust the turnbuckle length, the locknuts at each end of the barrel must be loosened. For the left side mechanism, turning the near side

R EFFECTIVITY: ALL

001B

32-22-01

Page 502
Jul 15/83



MAINTENANCE MANUAL

of the barrel downward (looking from aft to forward, turning clockwise) lengthens the turnbuckle and upward (looking from aft to forward, turning counterclockwise) shortens the turnbuckle. For the right side mechanism, turning the rear side of the barrel downward (looking from aft to forward, turning counterclockwise) shortens the turnbuckle and upward (looking from aft to forward, turning clockwise) lengthens the turnbuckle.

One quarter turn of the turnbuckle barrel changes the relationship of the gear down to gear up door position, X-Y (Ref. Fig. 501), approximately 1.0 inch.

WARNING: DURING TURNBUCKLE ADJUSTMENT, THE NLG MUST BE EXTENDED, DOWNLOCK SAFETY PIN INSTALLED, LANDING GEAR CONTROL LEVER IN DOWN POSITION, AND HYDRAULIC SYSTEM C PRESSURE OFF WHENEVER PERSONNEL ARE IN THE GEAR AND DOOR TRAVEL AREAS.

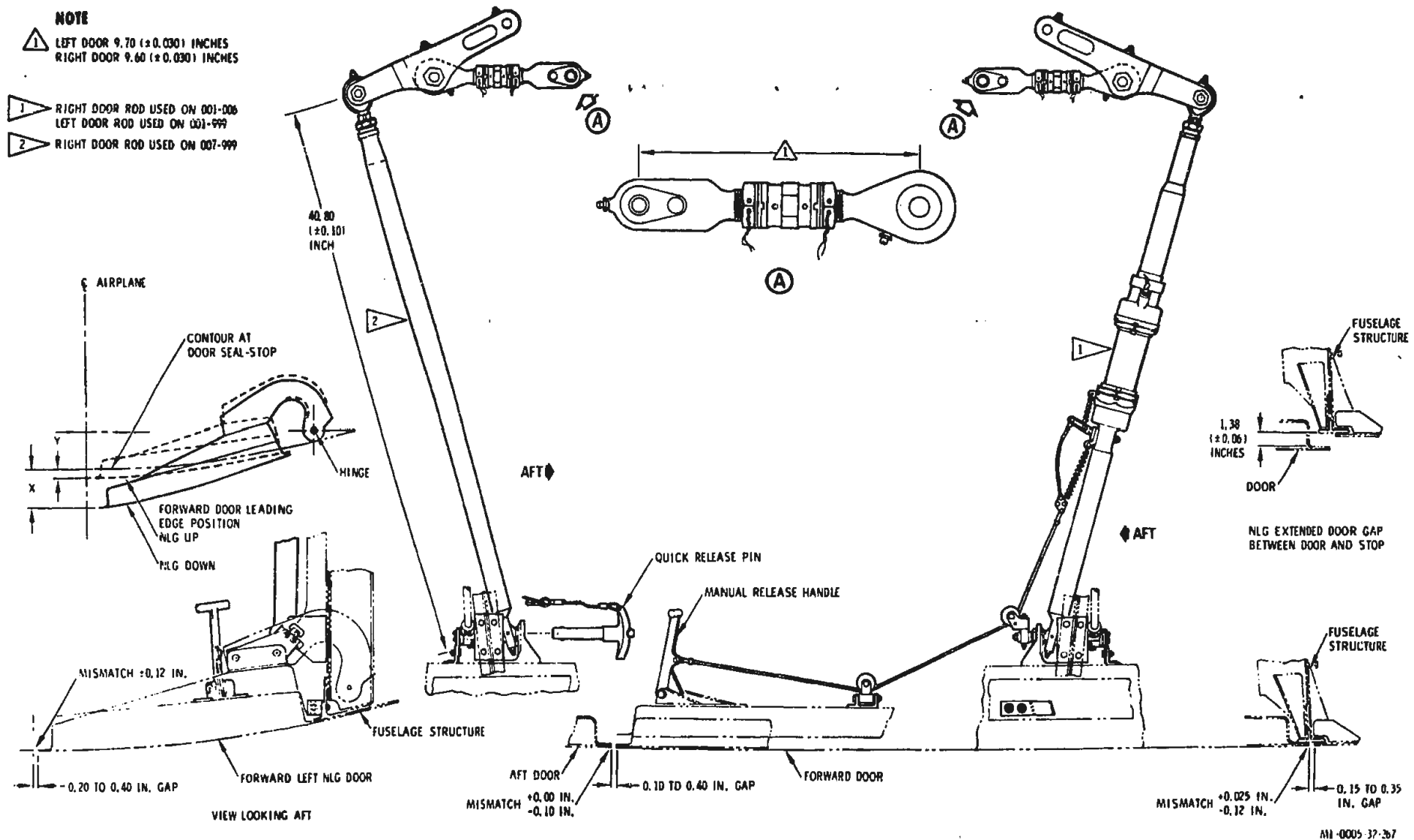
- (11) Adjust turnbuckle (not door rod) to obtain an X-Y dimension of 3.20 inches to 3.30 inches.
- (12) When an X-Y dimension of 3.20 inches to 3.30 inches has been obtained, tighten and safety the turnbuckle locknuts with lockwire.
- (13) With gear extended, adjust door rod length to obtain a clearance of 1.38 (± 0.060) inches between inboard leading edge of door and the associated stop. One full turn of rod end moves leading edge of door approximately 0.25 inch.
- (14) Tighten door rod locknuts and safety with lockwire.
- (15) On aircraft with adjustable stop bolts (SB-52-144), adjust stops (at aft end of each fwd door) to fair fwd doors with fuselage contour and aft doors.
- (16) Install downlock safety pin.
- (17) Remove both MLG inboard door actuator locks and close MLG doors (Ref. 32-33-00).
- (18) Turn off hydraulic system C pressure as required (Ref. 29-11-00).
- (19) Lower aircraft and remove jacks.

EFFECTIVITY: ALL

32-22-01
Page 503/504
Jul 15/83

NOTE

- 1 LEFT DOOR 9.70 (± 0.030) INCHES
RIGHT DOOR 9.60 (± 0.030) INCHES
- 1 RIGHT DOOR ROD USED ON 001-006
LEFT DOOR ROD USED ON 001-999
- 2 RIGHT DOOR ROD USED ON 007-999



Nose Landing Gear Forward Door - Adjustment and Test
Figure 501

EFFECTIVITY: ALL

32-22-01
Page 505/506
May 15/82

R
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001B

LOCKHEED
MAINTENANCE MANUAL

NOSE LANDING GEAR AFT DOOR - REMOVAL AND INSTALLATION

1. Equipment and Materials

Cotter Pin, MS24665-153, or equivalent

Cold-application, Solvent Cutback, Corrosion Preventive Compound, MIL-C-16173, Grade 4, or equivalent

Low Adhesion Sealing Compound, LAC Spec C-40-769, Type I, or equivalent

Integral Fuel Tank Sealing Compound, LAC Spec C-40-775, Type I or II, or equivalent

2. Referenced Procedures

20-12-01 Application of Corrosion Preventive Materials (LCP78-1128)

20-51-04 Environmental Sealing of Model L-1011 Airplane (PB75-425)

R 28-11-00 Tanks - Maintenance Practices

32-22-02 Nose Landing Gear Aft Door - Adjustment and Test

32-30-00 Landing Gear Retraction and Extension - Adjustment and Test

3. Removal/Installation

A. Removal

- (1) Disconnect bonding jumpers at each end of door to be removed (Ref. Fig. 401).
- (2) Disconnect door rod from door.
- (3) If left door is being removed, disconnect service interphone jack box and conduit from door and secure out of way.
- (4) Support door and remove nuts from forward hinge pin retaining block. Remove retaining block.
- (5) Remove antirotation clip and hinge bolt from aft hinge.

EFFECTIVITY: ALL

001B

32-22-02
Page 401
May 15/85

LOCKHEED
MAINTENANCE MANUAL

- (6) Remove door.
- (7) Remove and inspect hinge pin.

B. Installation

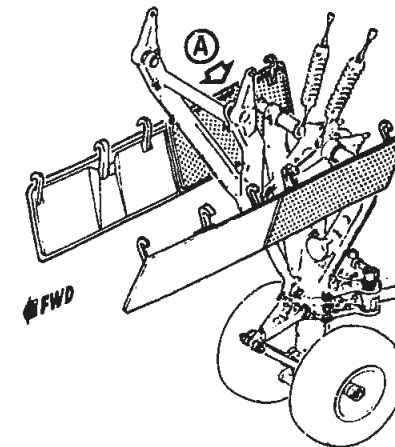
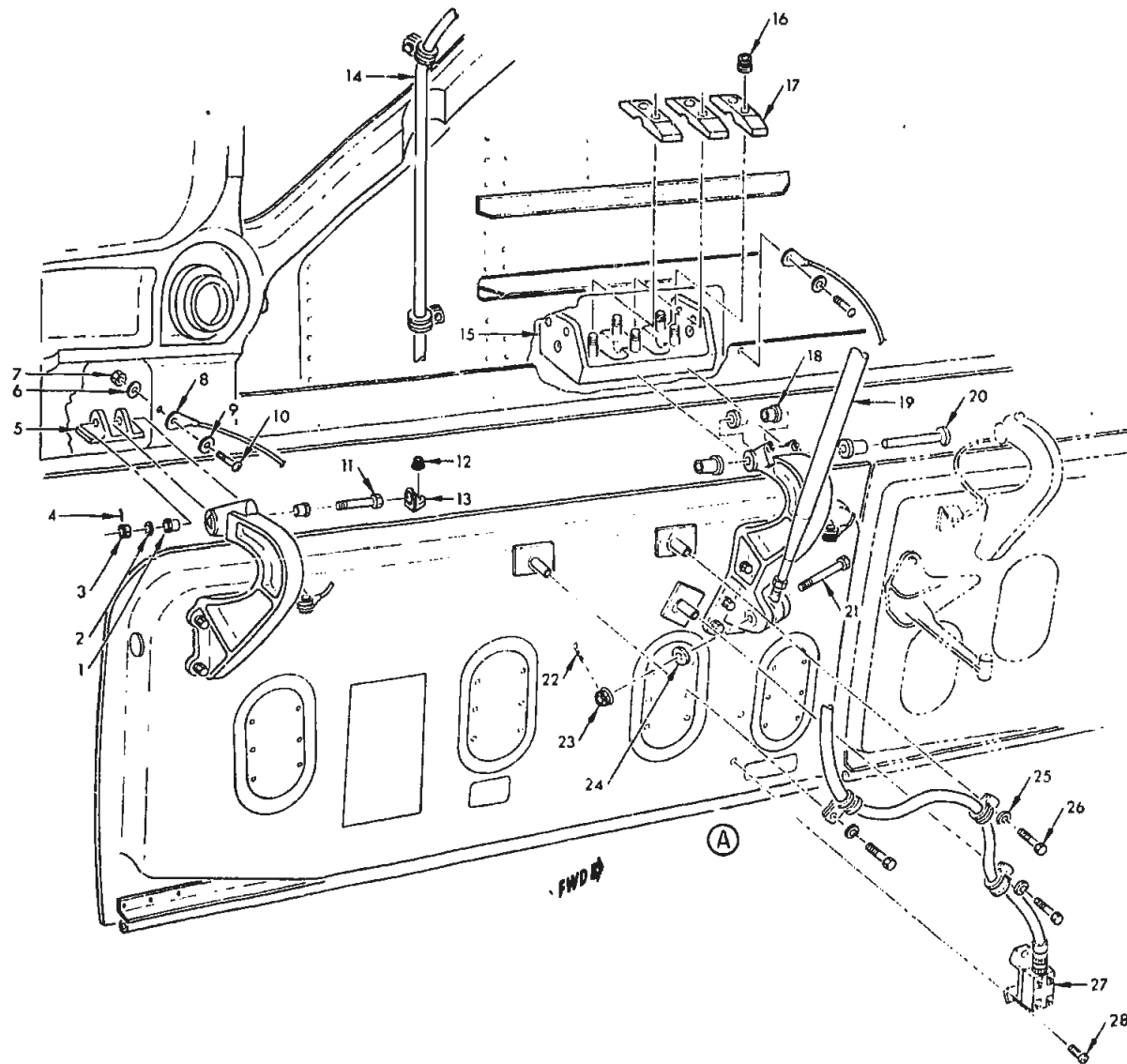
- (1) Install forward hinge pin in door hinge with antirotation flat on head aligned with nesting groove in fuselage hinge half.
- (2) Position door and align door hinge points to fuselage hinge halves. Install rear hinge bolt and washer. Install antirotation clip.
- (3) Coat threads of nut with low adhesion sealing compound, (Ref. 20-51-04) and install. Safety with cotter pin.
- (4) Coat hinge pin retainer face and hinge faying surface with cold-application, solvent cutback, corrosion preventive compound (Ref. 20-12-01) and install retainer.
- (5) Install retainer holddown nuts.
- (6) Connect door rod and bonding jumpers.
- (7) Fillet-seal both ends of bonding jumpers with integral fuel tank sealing compound (Ref. 28-11-00).
- (8) If left door is being installed, install service interphone jack box and secure conduit.
- (9) Perform nose landing gear aft door adjustment and test (Ref. 32-22-02).
- (10) Perform landing gear retraction and extension (Ref. 32-30-00).

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EFFECTIVITY: ALL

001B

32-22-02
Page 402
May 15/85



- | | |
|-----------------------------|-----------------------------------|
| 1 BUSHING (2 PLACES) | 15 FORWARD HINGE |
| 2 WASHER | 16 NUT (6 PLACES) |
| 3 NUT | 17 PIN RETAINING BLOCK (3 PLACES) |
| 4 COTTER PIN | 18 BUSHING (4 PLACES) |
| 5 AFT HINGE | 19 DOOR ROD |
| 6 WASHER | 20 HINGE PIN |
| 7 NUT | 21 BOLT |
| 8 BONDING JUMPER (2 PLACES) | 22 COTTER PIN |
| 9 WASHER (2 PLACES) | 23 NUT |
| 10 SCREW (2 PLACES) | 24 WASHER |
| 11 BOLT | 25 WASHER (3 PLACES) |
| 12 NUT | 26 BOLT (3 PLACES) |
| 13 LOCK | 27 SERVICE INTERPHONE JACK |
| 14 CONDUIT | 28 SCREW (2 PLACES) |

Nose Landing Gear Aft Door - Removal and Installation
Figure 401

32-22-02
Page 403/404
Dec 1/72

EFFECTIVITY: ALL

NOSE LANDING GEAR AFT DOOR - ADJUSTMENT AND TEST1. Equipment and Materials

Jack Pad Adapters

Forward Fuselage Jack

Lock-wire, QQ-W-390, Inconel, Temp A, 0.040 inch diameter, or equivalent

Cotter Pin, MS 24665-149, or equivalent

2. Referenced Procedures

7-11-00 Wing and Fuselage Jacking - Maintenance Practices

29-11-00 Hydraulic Power System - Maintenance Practices

R 32-33-00 Main Landing Gear Inboard Door - Maintenance
R Practices

3. Adjustment/TestA. Adjustment

R (1) Install MLG downlock safety pins. Open both MLG
R inboard doors and install MLG door locks (Ref.
32-33-00).

(2) Jack aircraft at fuselage jack point to a height which will permit retraction and extension of nose landing gear (Ref. 7-11-00).

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

EFFECTIVITY: ALL

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32-22-02Page 501
Aug 15/82



MAINTENANCE MANUAL

- (3) Turn on hydraulic system C pressure (Ref. 29-11-00). Use a flow-rate controllable hydraulic pressure source and set rate for slow retraction.
- (4) Disconnect door rod from door.
- (5) Retract nose landing gear.
- (6) Manually close door.
- (7) While door is manually held closed, adjust rod length so that door rod can be connected (Ref. Fig. 501) Connect door rod.
- (8) On aircraft 001-031 WITHOUT SB52-144, adjust rod length so that door assembly is fully closed and is flush with fuselage contour.
- (8) On aircraft 001-031 WITH SB52-144 AND 032-033, adjust rod length so that door assembly is fully closed, then adjust stops at forward end of each door to fair doors into fuselage contour.
- (9) Cycle nose landing gear, and check for proper operation and adjustment.
- (10) Extend nose landing gear and install downlock safety pin.
- (11) Tighten locknut and safety with lock-wire.
- (12) Remove both MLG inboard door actuator locks and close both doors (Ref. 32-10-00).
- (13) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (14) Lower aircraft and remove jack.

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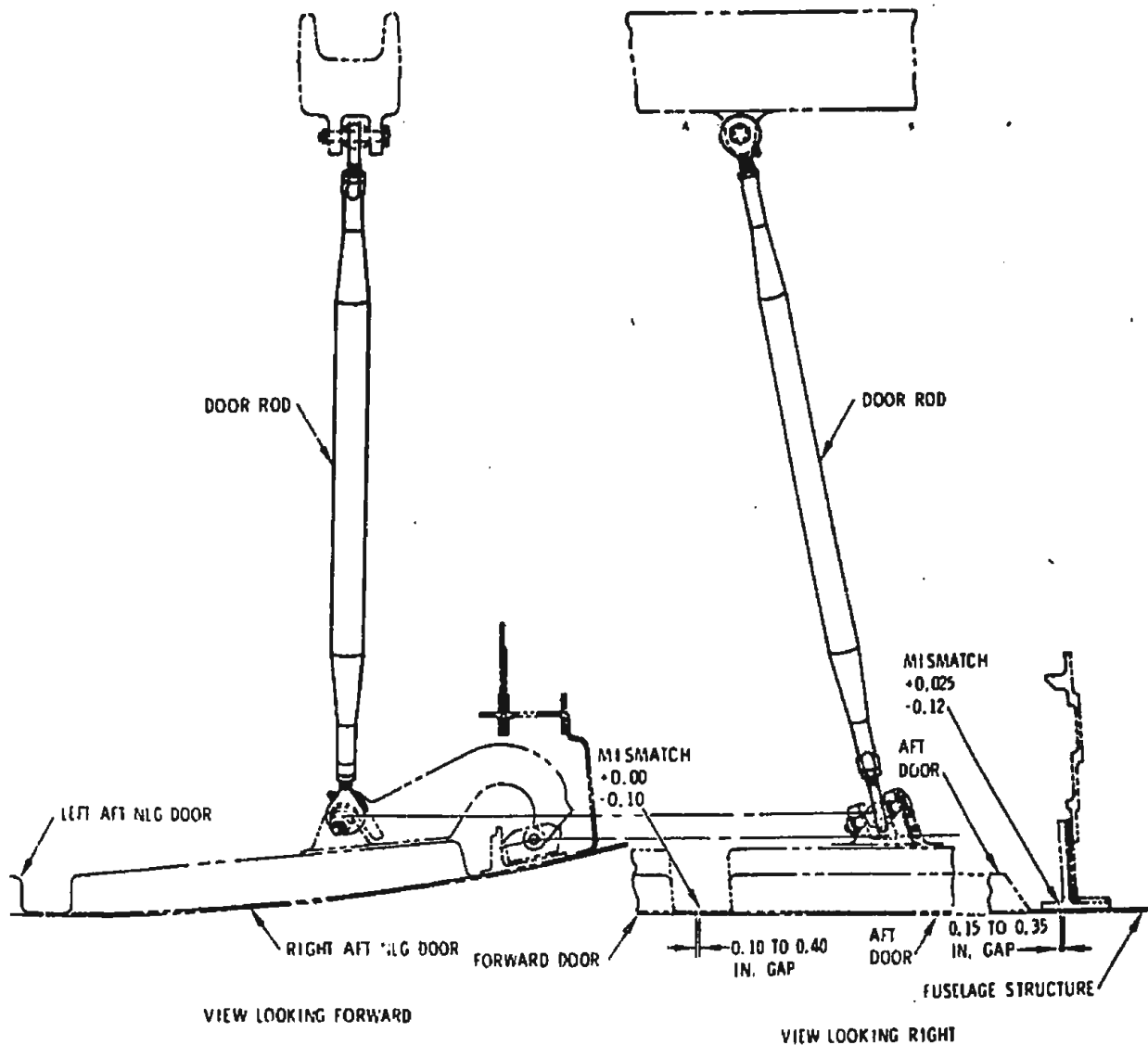
EFFECTIVITY: ALL

001B

32-22-02

Page 502
Nov 15/81

LOCKHEED
MAINTENANCE MANUAL



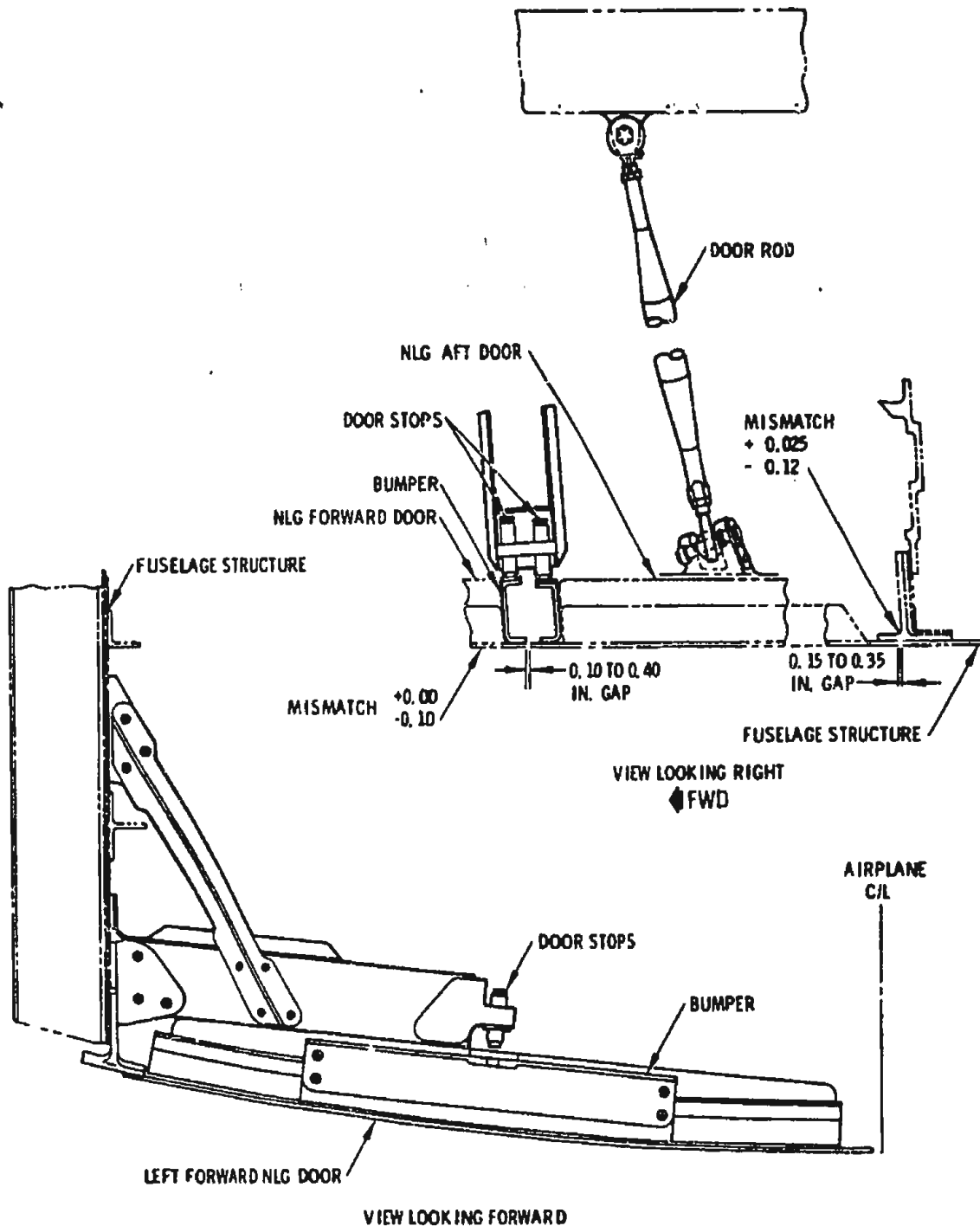
HA 0719
M1-0101-32-264

Nose Landing Gear Aft Door - Adjustment and Test
Figure 501

R R
001B EFFECTIVITY: 001-031 WITHOUT SB52-144

32-22-02
Page 503
Dec 15/80

LOCKHEED
MAINTENANCE MANUAL



M1-0000-32-526

Nose Landing Gear Aft Door - Adjustment and Test
Figure 501

EFFECTIVITY: 001-031 WITH SB52-144 AND 032-033

32-22-02
Page 504
Aug 15/81

001B

LOCKHEED
MAINTENANCE MANUAL

R **EXTENSION AND RETRACTION - DESCRIPTION AND OPERATION**

R 1. General

R The extension and retraction system is comprised of the
R subsystems listed below. For detailed information concerning a
R particular subsystem, refer to the following sections:

- | | | |
|----------|-----------------|--|
| R | 32-31-00 | Landing Gear Control System |
| R | 32-32-00 | Main Landing Gear Extension and Retraction |
| R | 32-33-00 | Main Landing Gear Door Actuation |
| R | 32-34-00 | Nose Landing Gear Extension |
| R | 32-35-00 | Nose Landing Gear Door Actuation |
| R | 32-36-00 | Landing Gear Alternate Hydraulic Extension System |
| R | 32-37-00 | Landing Gear Mechanical Extension System |

R EFFECTIVITY: ALL
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050

32-30-00
Page 1/2
Apr 1/72

LOCKHEED
MAINTENANCE MANUAL

EXTENSION AND RETRACTION - FAULT ISOLATION

1. General

Reference data and fault isolation procedures for troubleshooting landing gear system faults are included in this section of the manual. A landing gear system malfunction detected by the flight crew is normally entered in the aircraft flight log book and reported to maintenance personnel by a FIRM fault code number. This number and the flight log book write-up can be found in the Chapter 32 Fault Code Index. The index specifies the maintenance manual section, fault isolation diagram figure number and, where appropriate, a block number indicating the diagram entry point containing the fault isolation procedure. When no block number is specified, the diagram entry point is Block 1.

Prerequisites listed at the top of each diagram identify mandatory preliminary steps and circuit breakers that must be closed before initiating any fault isolation step.

Schematic diagrams, identified by a SCHEM number, supplement fault isolation procedures as maintenance aids. The schematics show the basic system circuitry necessary for troubleshooting and include cross-reference indexes to the wiring diagram pages required for checking component interconnect wiring.

2. Supplemental Data

Supplementary data includes functional tests, checkout tests, BITE checks and other general information that can be helpful in performing fault isolation. Supplementary data in this section is listed in Table 101.

Supplemental Data
Table 101

FIGURE

TITLE

101

Landing Gear Hydraulic Diagram

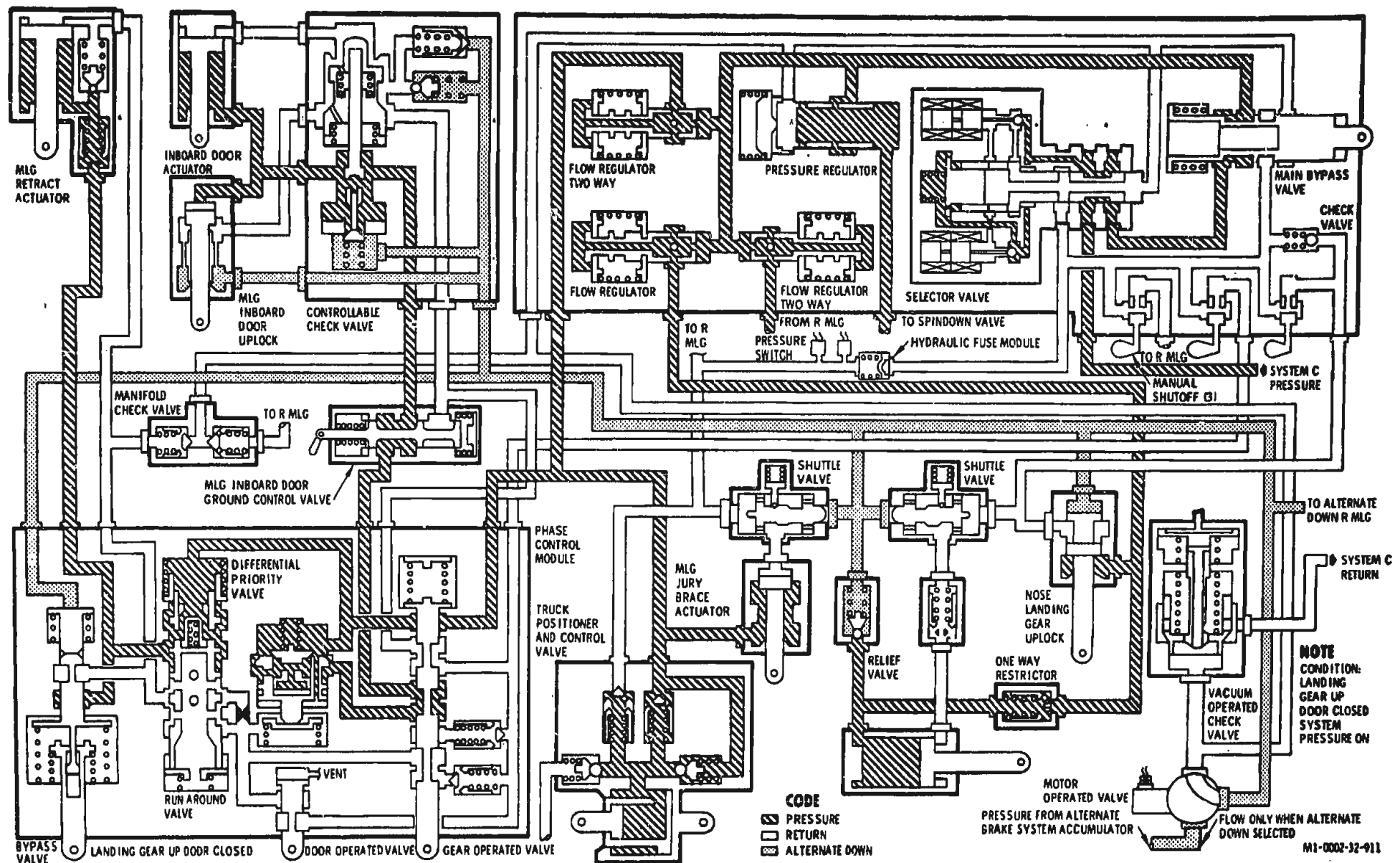
3. Fault Isolation

Table 102 is a list of fault isolation data in this section of the manual.

EFFECTIVITY: ALL

32-30-00

Page 101
Mar 15/81



Landing Gear Hydraulic Diagram
Figure 101 (Sheet 2)



32-30-00
Page 107/108
Nov 15/88

LOCKHEED



MAINTENANCE MANUAL

COMPONENT	QTY	AREA/ACCESS	REFERENCE
ACTUATOR:			
MLG INBOARD DOOR	2	MLG WHEEL WELL	32-33-01
MLG JURY BRACE	2	AT MLG JURY BRACE	32-32-02
MLG RETRACT	2	MLG STRUT WELL	32-32-01
NLG RETRACT	1	NLG STRUT	32-34-01
NLG UPLOCK	1	NLG WHEEL WELL	32-34-05
CONTROL LEVER, LANDING GEAR	1	FLIGHT STATION; P2	32-31-14
FILTER, HYDRAULIC RETURN (SYS C)	1	HSC; 147AB	29-11-20
JURY BRACE ASSEMBLY, MLG	2	ON MLG	32-11-25
JURY BRACE, NLG	1	NLG WHEEL WELL	32-21-07
LOGIC CARD J3	1	MESC; 192K, 192AE	31-22-02
LOGIC CARD J11	1	MESC; 192K, 192AE	31-22-02
MODULE, HYDRAULIC FUSE	1	HSC; 147AB	32-31-16
MODULE, PHASE CONTROL	2	MLG WHEEL WELL	32-33-06
SPRING GUIDE, MLG JURY BRACE	4	AT JURY BRACE ASSEMBLY	32-11-20
VALVE:			
MAIN BYPASS	1	HSC; 147AB	32-31-06
DIFFERENTIAL PRIORITY	2	MLG WHEEL WELL	32-33-09
FLOW REGULATOR (6GPM)	1	HSC; 147AB	32-31-05
FLOW REGULATOR (23GPM)	2	HSC; 147AB	32-31-04
LANDING GEAR SELECTOR	1	HSC; 147AB	32-31-02
PRESSURE CONTROLLED CHECK	2	MLG WHEEL WELL	32-33-04
RUNAROUND	2	MLG WHEEL WELL	32-33-05
MANUAL SHUTOFF	3	HSC; 147AB	32-31-08

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Component Location Index
Figure 102

EFFECTIVITY: ALL

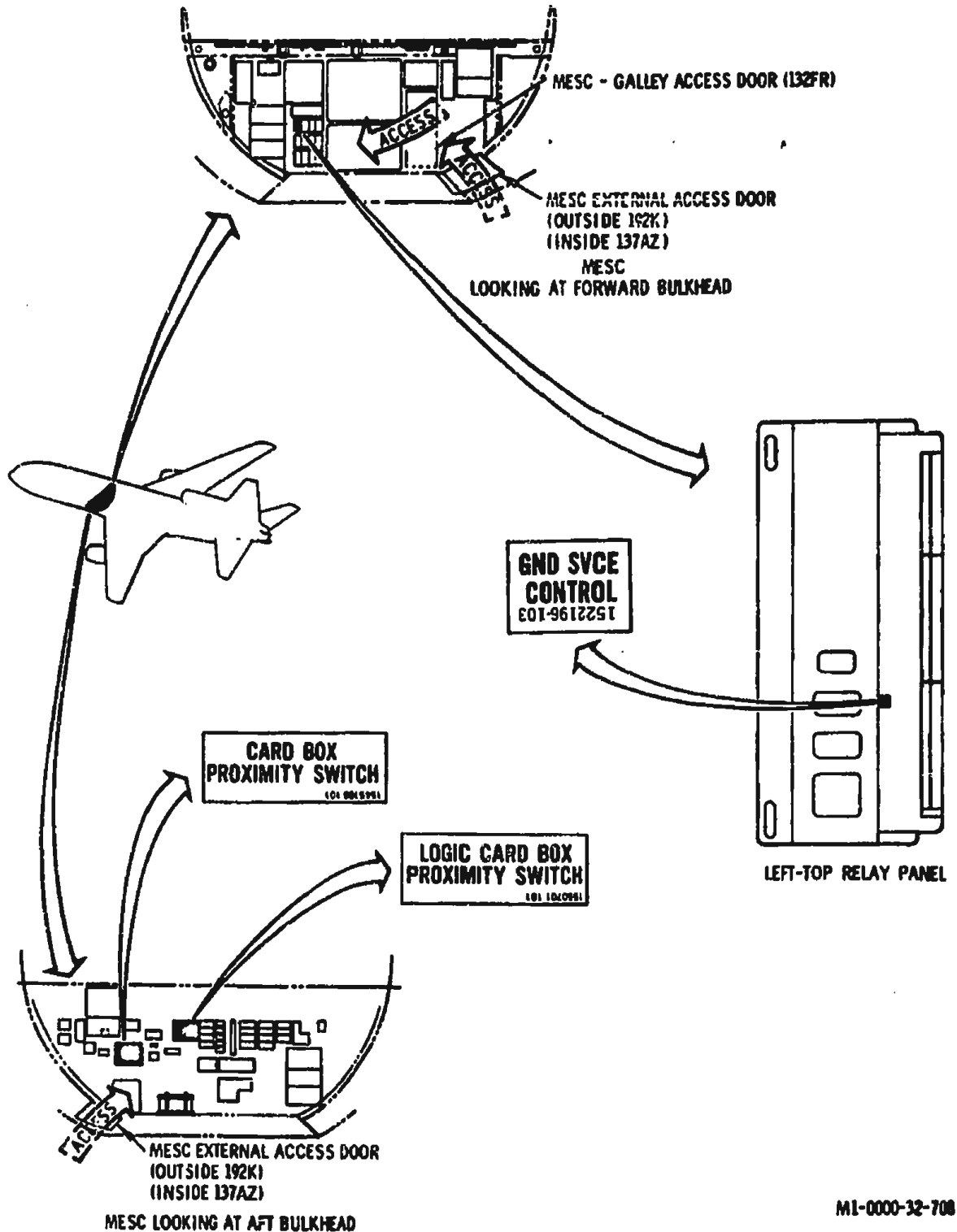
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32-30-00
Page 109
Dec 15/93

LOCKHEED



MAINTENANCE MANUAL



MI-0000-32-708

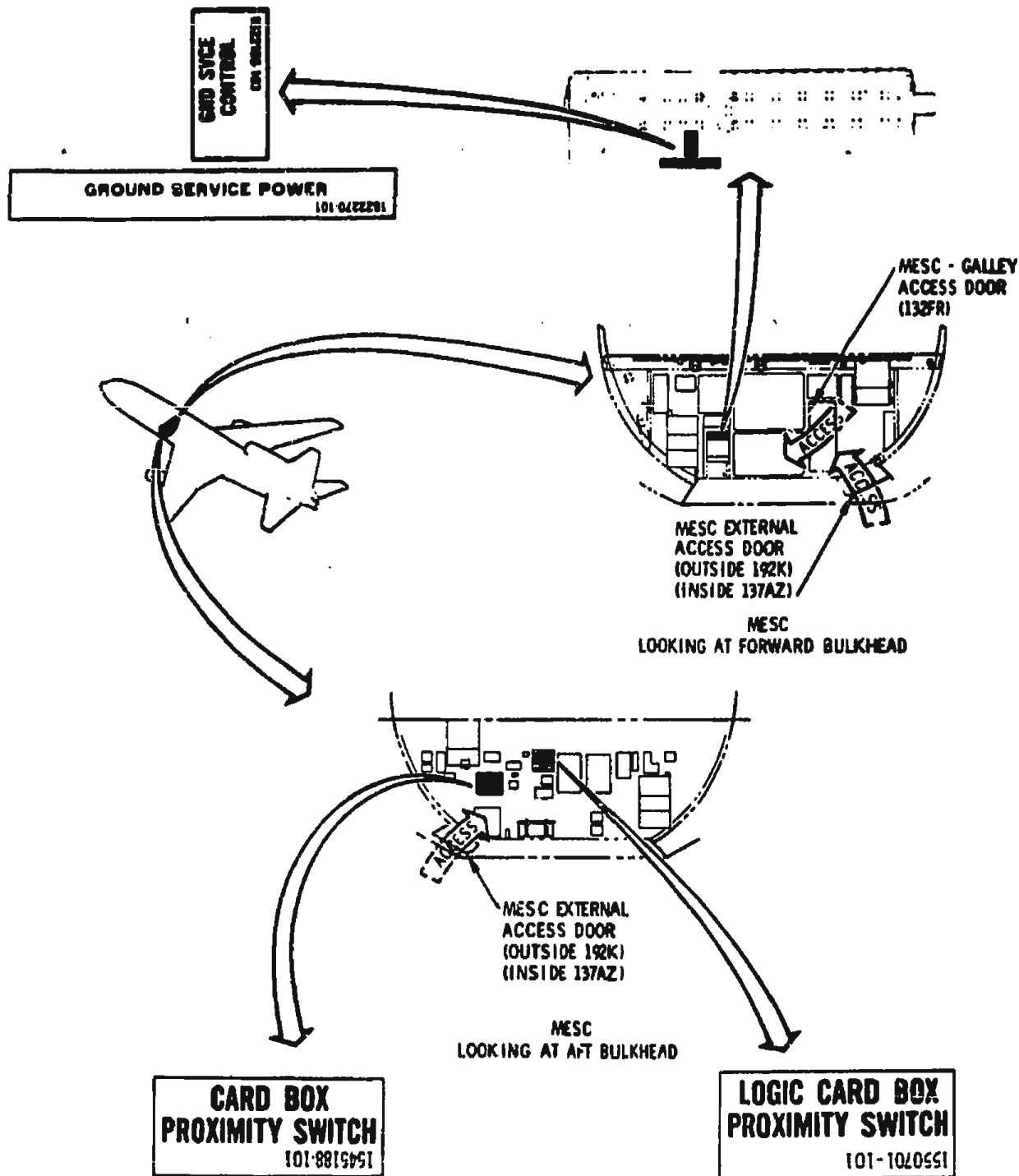
Extension and Retraction Component Locator
Figure 103 (Sheet 1)

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EFFECTIVITY: 001-023

32-30-00
Page 110
Nov 15/88

LOCKHEED
MAINTENANCE MANUAL



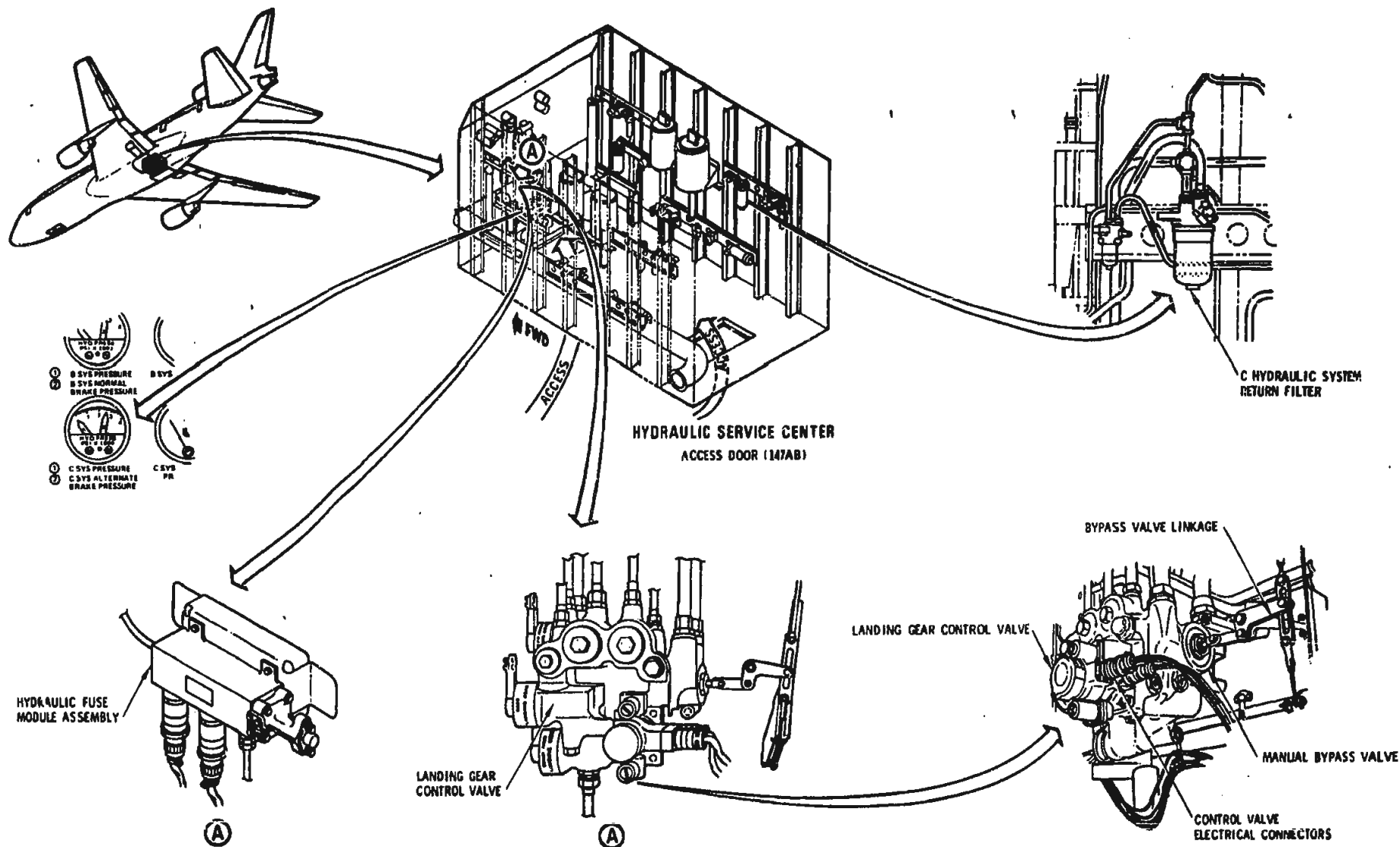
M1-0000-32-709

Extension and Retraction Component Locator
Figure 103 (Sheet 1)

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EFFECTIVITY: 024-999

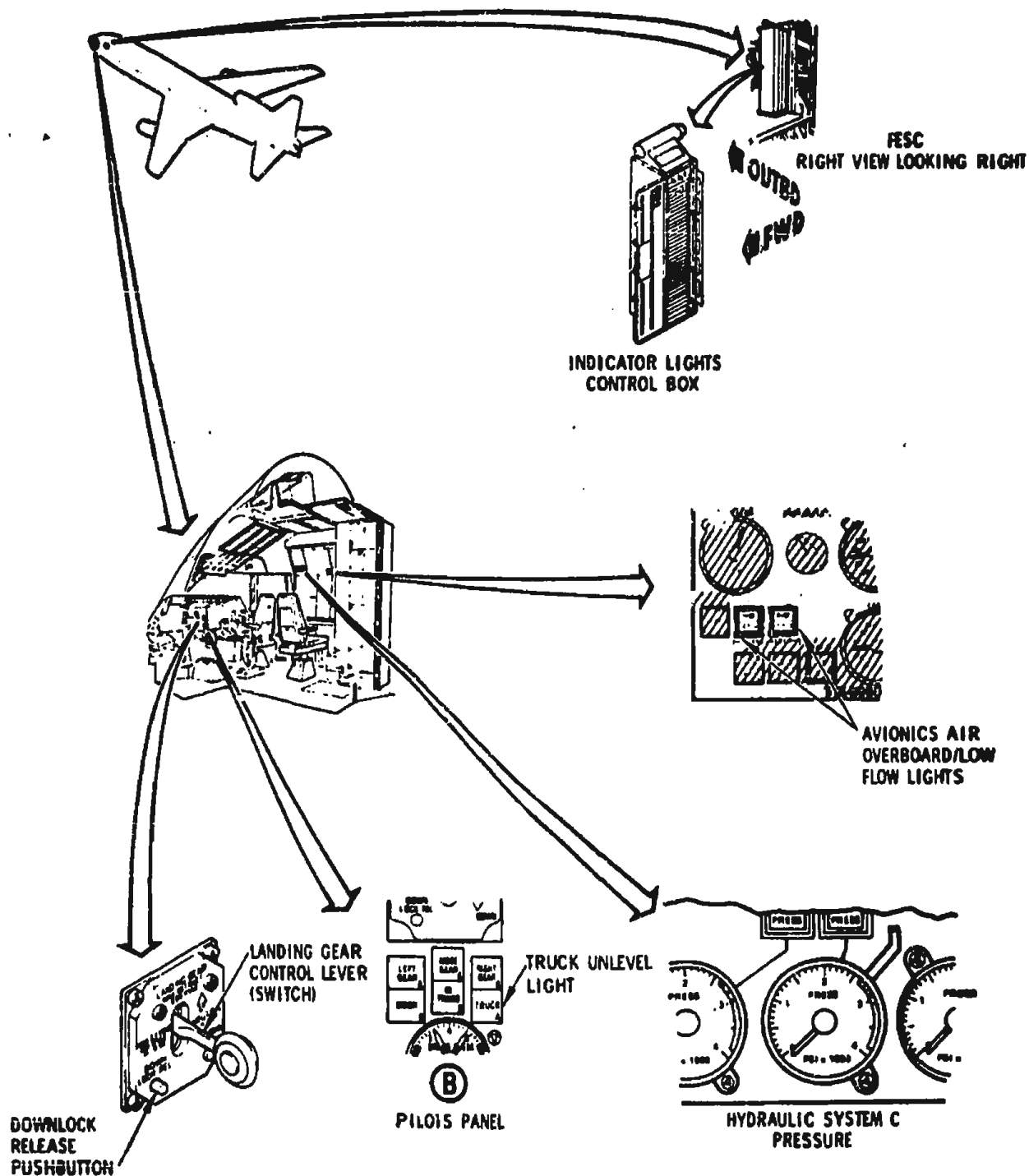
32-30-00
Page 111/112
Nov 15/88



MI-0000-32-413

Extension and Retraction Component Locator
Figure 103 (Sheet 2)

LOCKHEED
MAINTENANCE MANUAL



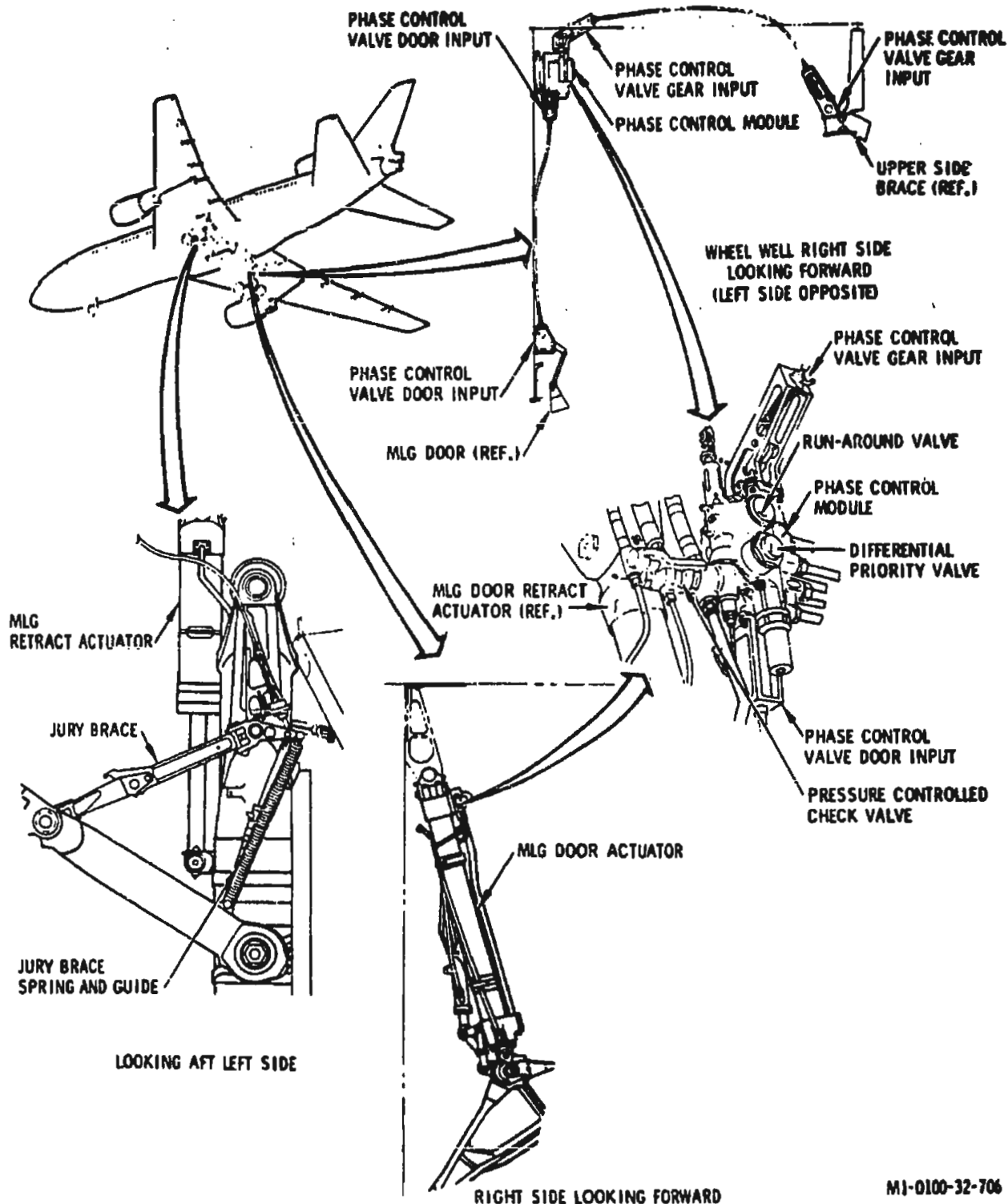
M1-0000-32-704

Extension and Retraction Component Locator
Figure 103 (Sheet 3)

R EFFECTIVITY: ALL
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32-30-00
Page 115
Nov 15/88

LOCKHEED
MAINTENANCE MANUAL



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Extension and Retraction Component Locator
Figure 103 (Sheet 4)

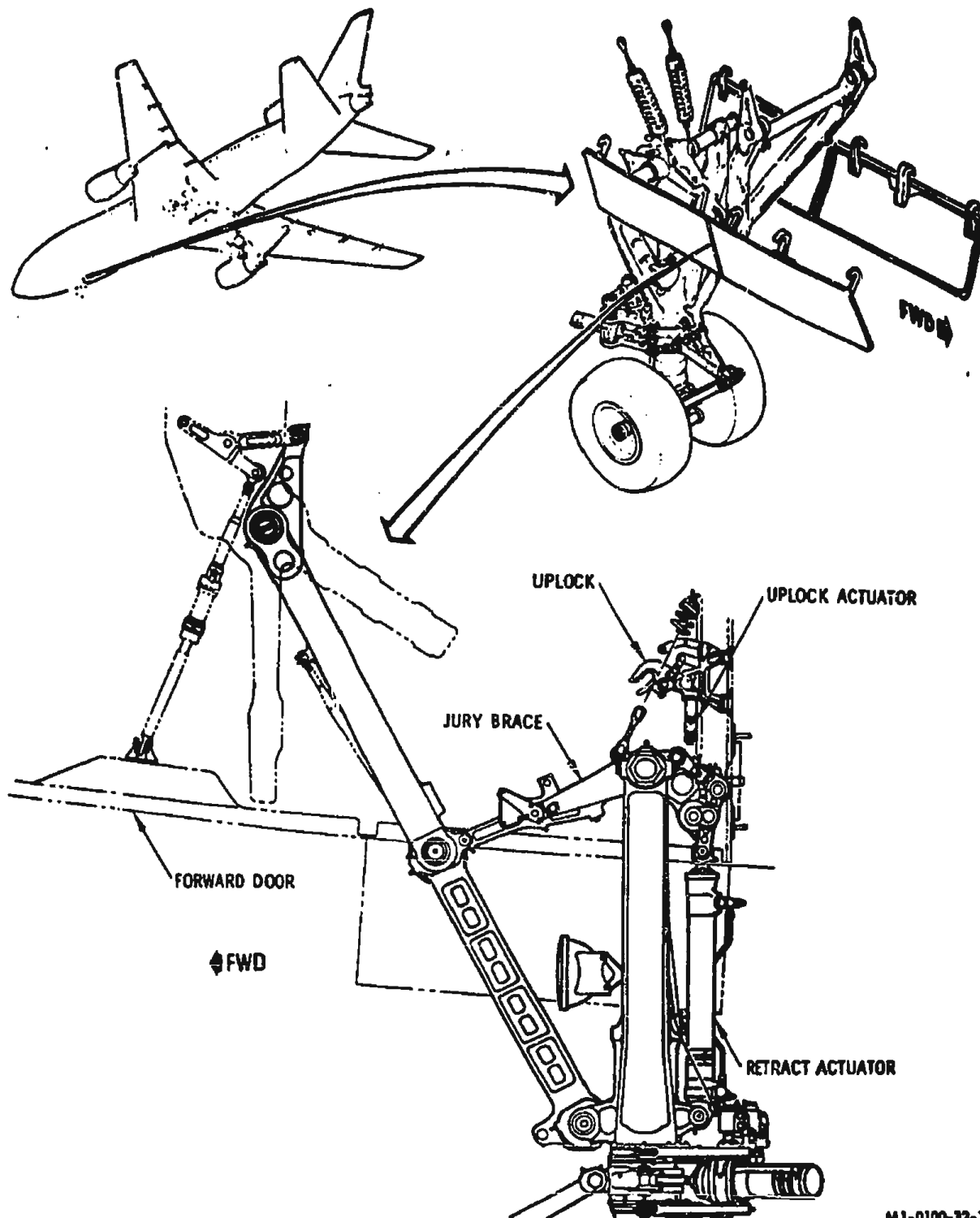
R EFFECTIVITY: ALL
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32-30-00
Page 116
Nov 15/88

LOCKHEED



MAINTENANCE MANUAL



M1-0100-32-707

Extension and Retraction Component Locator
Figure 103 (Sheet 5)

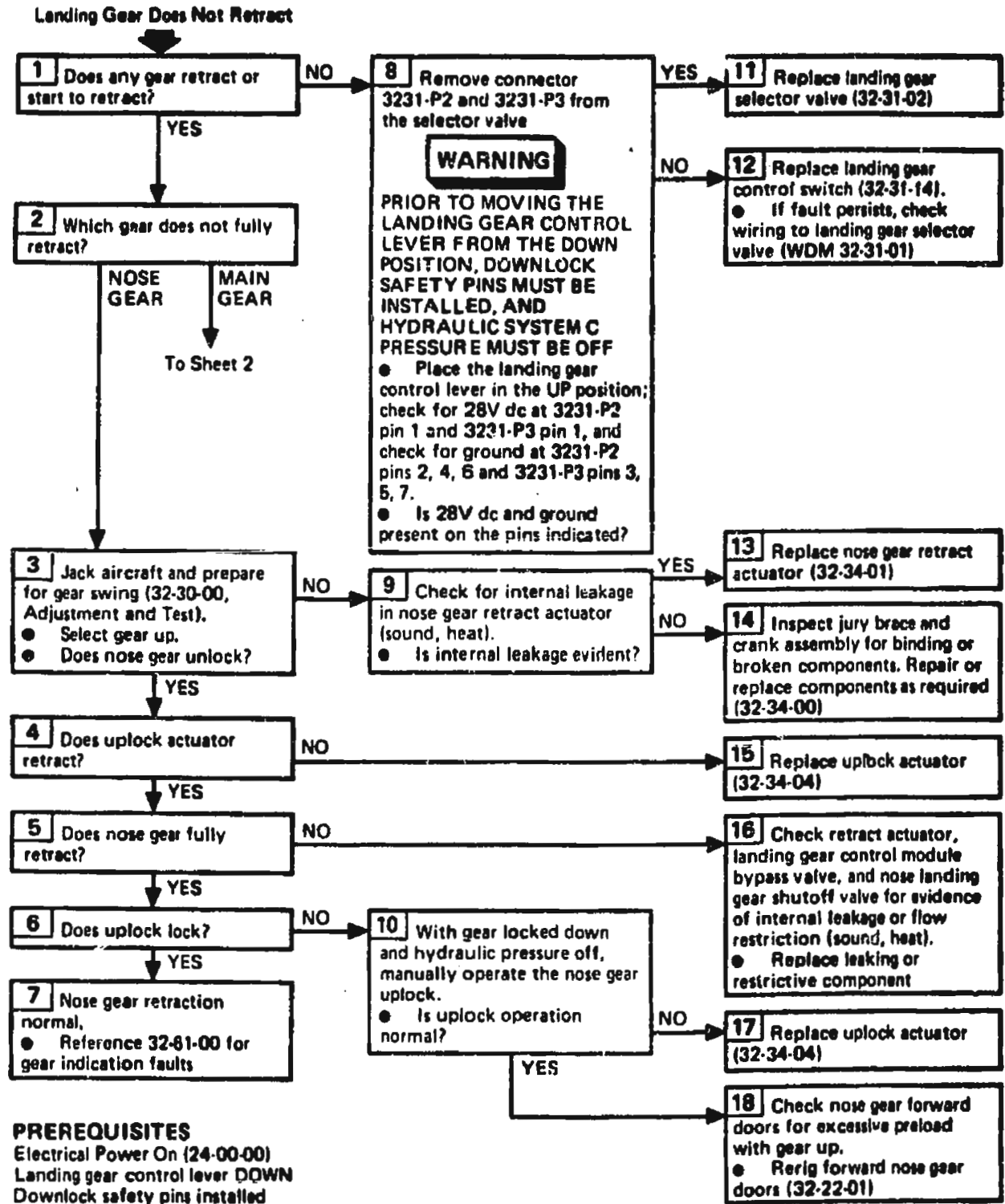
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EFFECTIVITY: ALL

32-30-00
Page 117
Nov 15/88

LOCKHEED

MAINTENANCE MANUAL



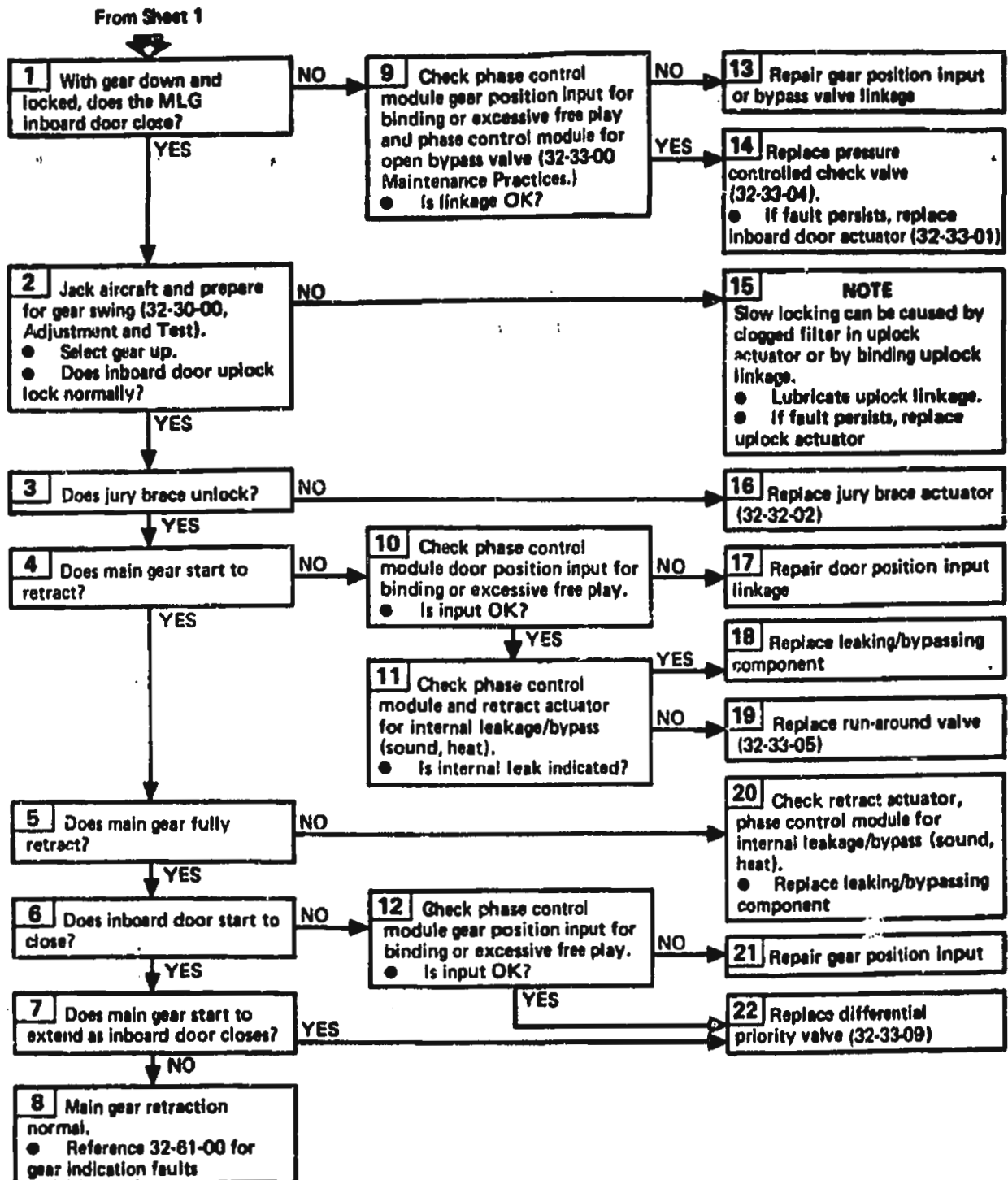
M1-0103-32-613

Landing Gear Does Not Retract
Figure 104 (Sheet 1)

R EFFECTIVITY: ALL
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001B

32-30-00
Page 118
Nov 15/88

LOCKHEED
MAINTENANCE MANUAL



M1-0001-32-004

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Landing Gear Does Not Retract
Figure 104 (Sheet 2)

EFFECTIVITY: ALL

32-30-00
Page 119
Dec 15/93

001B

LOCKHEED

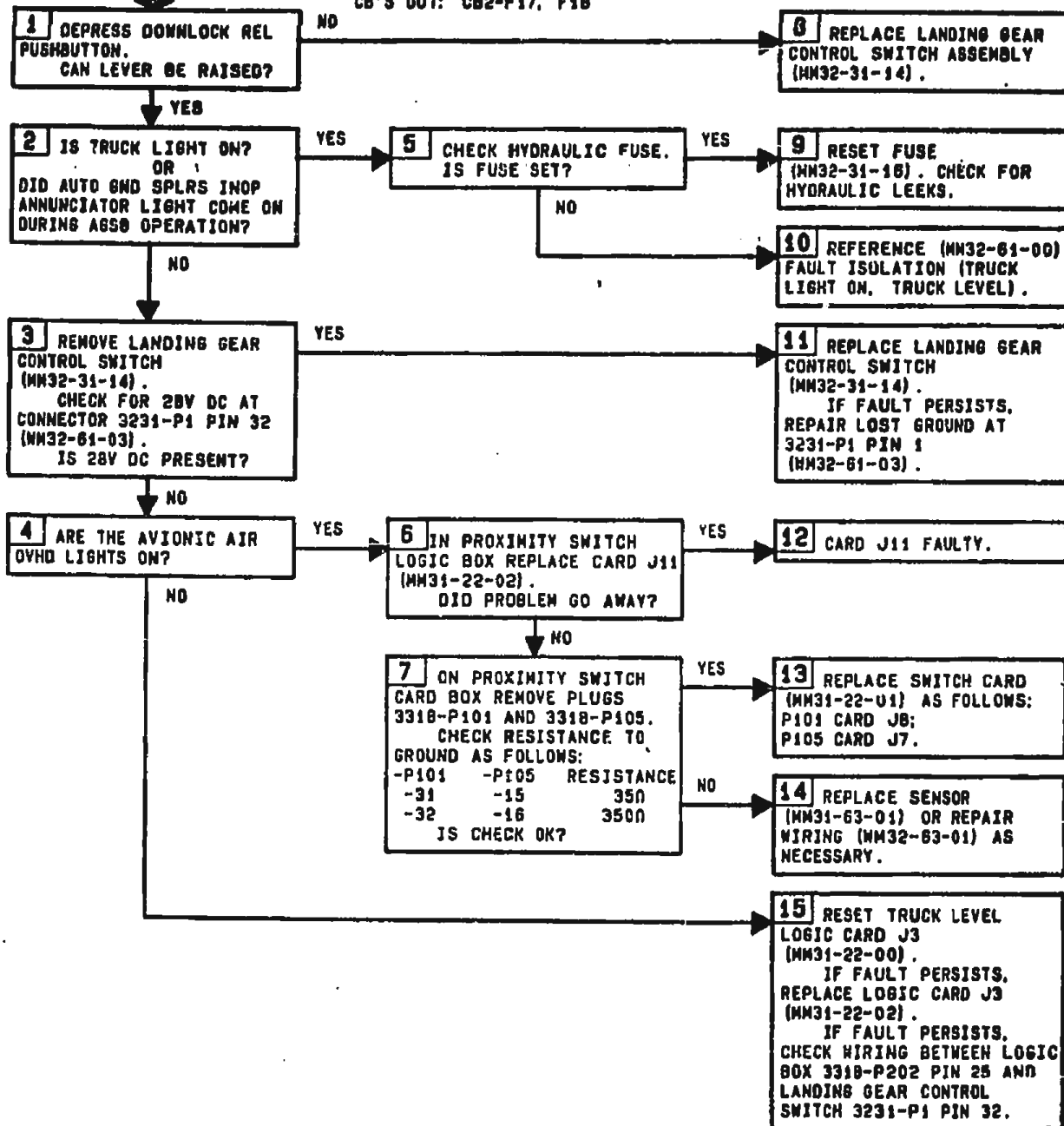
MAINTENANCE MANUAL



PREREQUISITES

ELECTRICAL POWER (MM24-00-00)
 LANDING GEAR DOWNLOCK SAFETY PINS INSTALLED
 MAIN LANDING GEAR IN AIRBORNE CONDITION (MM32-03-00)
 HYDRAULIC PRESSURE C OFF (MM28-11-00)
 CB'S IN: CB1-L10, L11
 CB2-L6, L10
 CB3-H3, H4
 GALLEY LEFT - 220
 CB'S OUT: CB2-F17, F18

LANDING GEAR CONTROL LEVER CANNOT BE RAISED



MI-0001-32-812

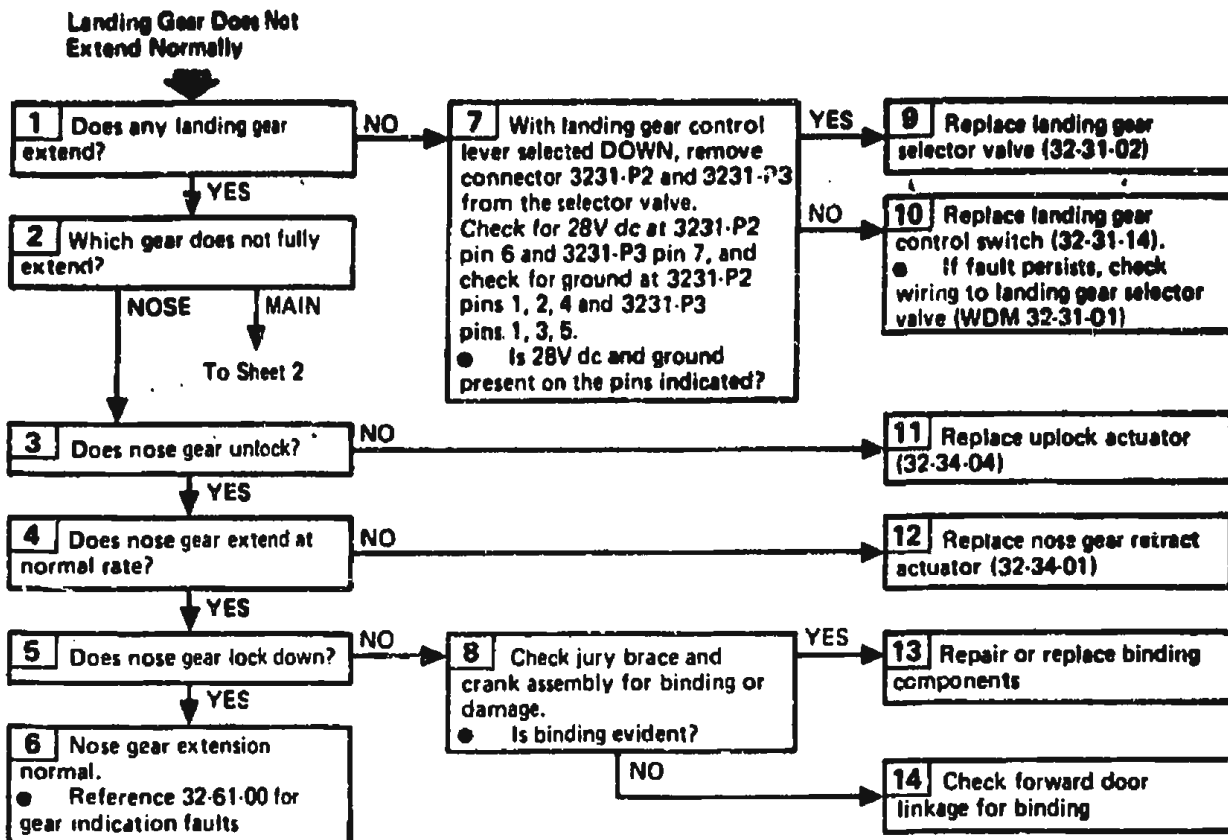
LANDING GEAR Control Lever Cannot Be Raised
Figure 105

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EFFECTIVITY: ALL

32-30-00
 Page 120
 Nov 15/88

LOCKHEED
MAINTENANCE MANUAL



PREREQUISITES

Electrical Power On (24-00-00)
Landing gear control lever DOWN
Downlock safety pins installed
CB's in: CB2-F17, F18

M1-0102-32-621

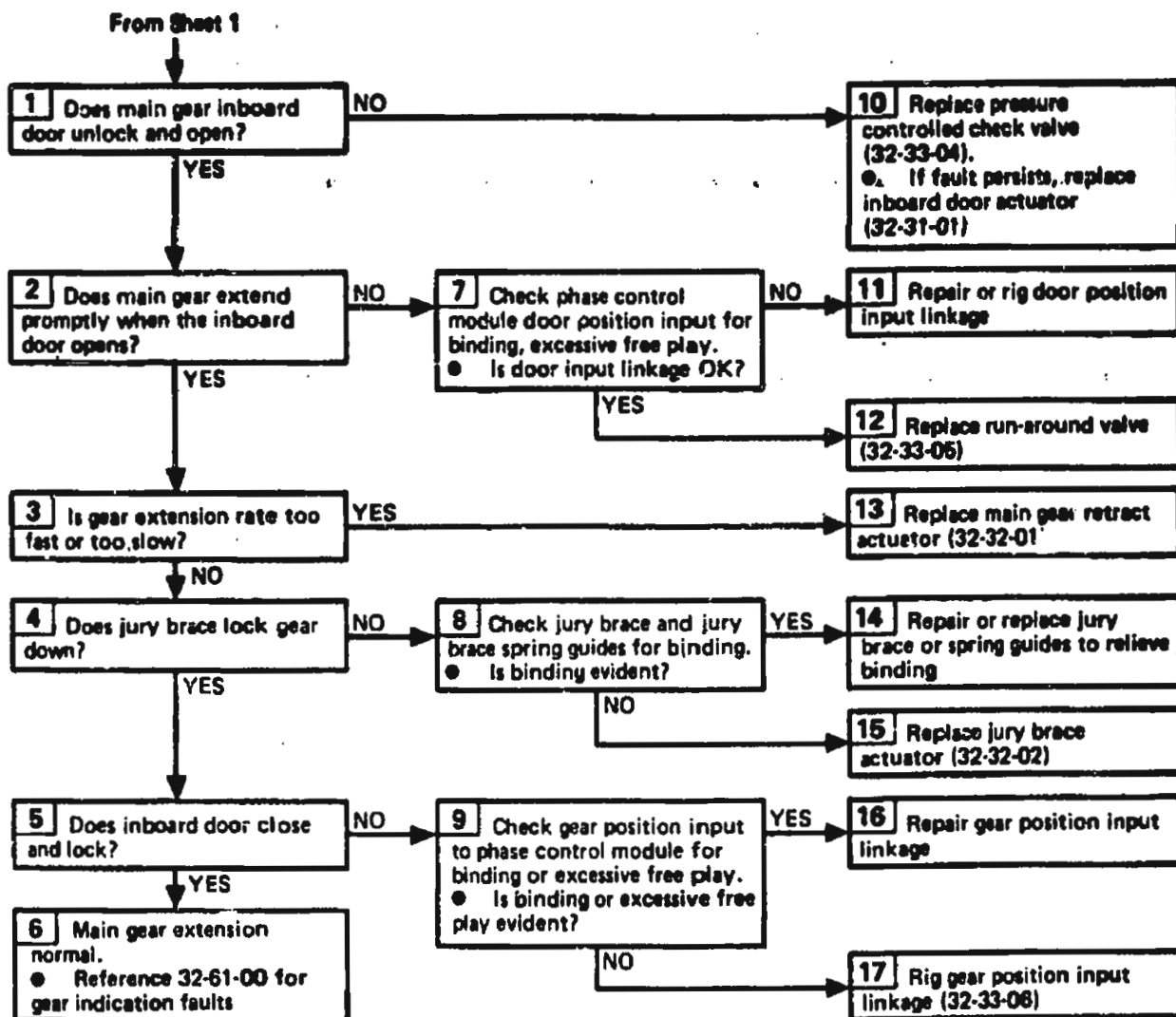
Landing Gear Does Not Extend Normally
Figure 106 (Sheet 1)

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EFFECTIVITY: ALL

32-30-00
Page 121
Nov 15/88

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-005

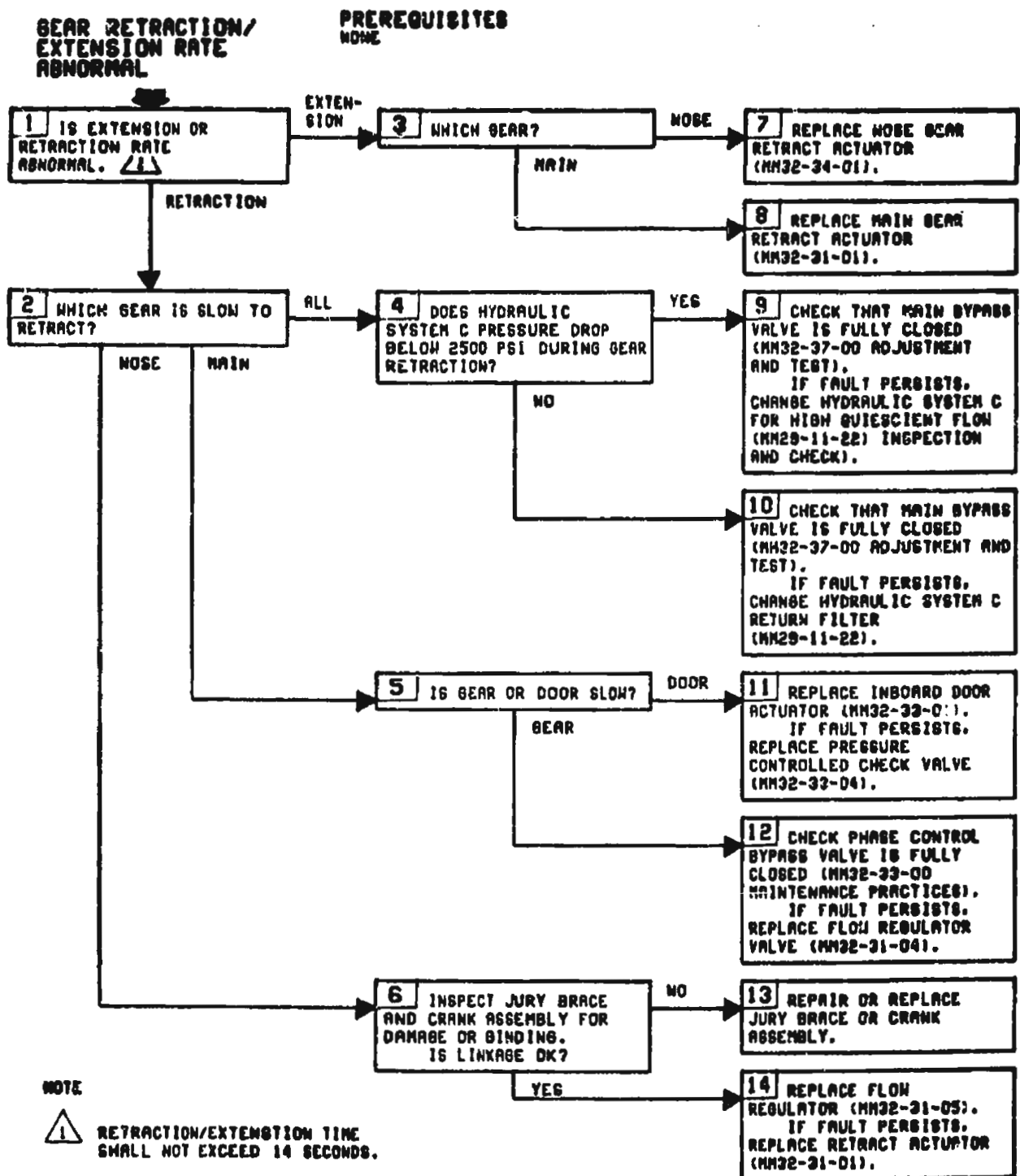
Landing Gear Does Not Extend Normally
Figure 106 (Sheet 2)

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EFFECTIVITY: ALL

32-30-00
Page 122
Nov 15/88

LOCKHEED
MAINTENANCE MANUAL

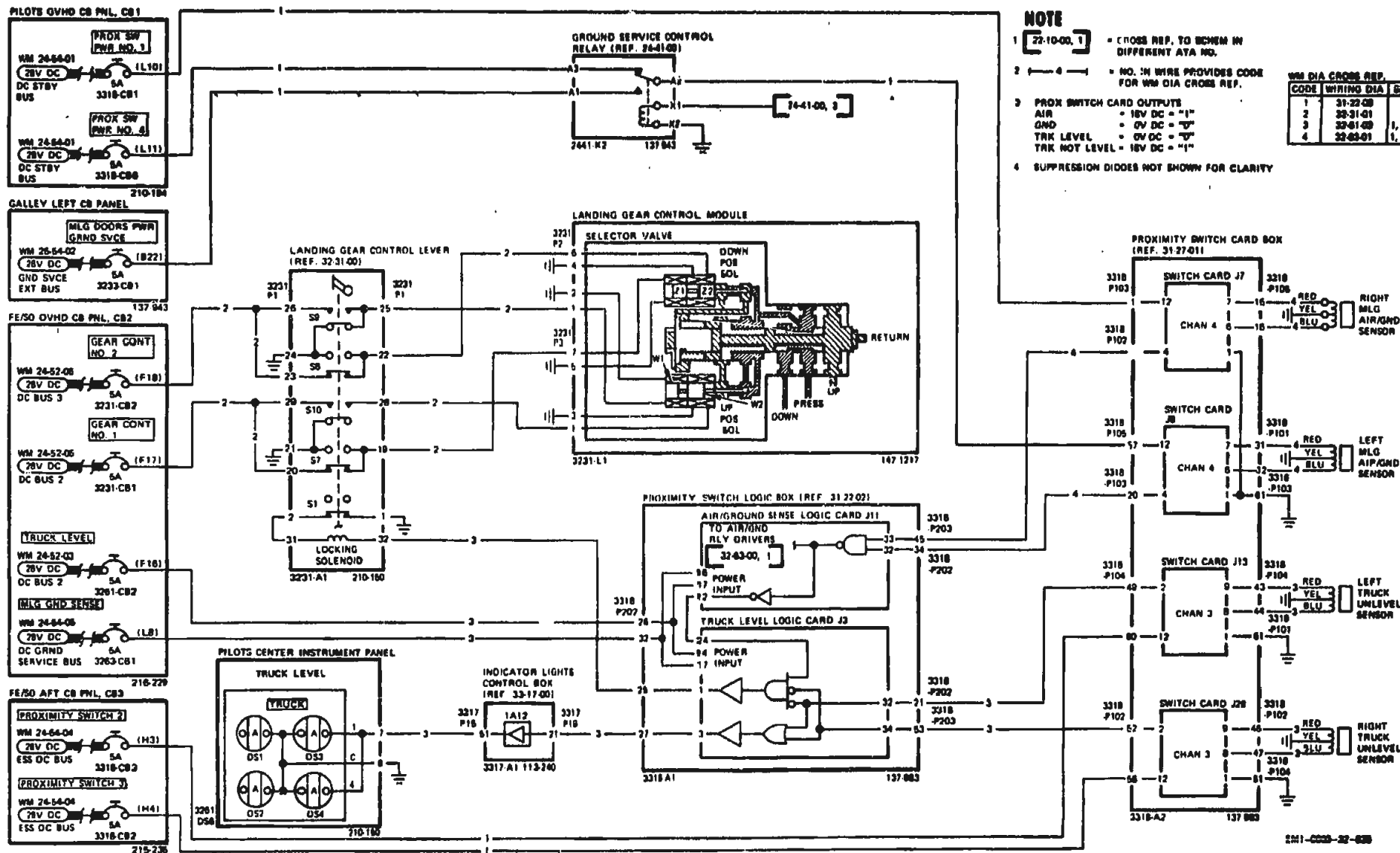


81-0000-00-2010

Landing Gear Retraction/Extension Rate Abnormal
Figure 107

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001B EFFECTIVITY: ALL

32-30-00
Page 123/124
Nov 15/88



Landing Gear Control Electrical Schematic
SCHEM 1

LOCKHEED
MAINTENANCE MANUAL

LANDING GEAR RETRACTION AND EXTENSION
MAINTENANCE PRACTICES

1. General

The retraction function may be deactivated by performing the procedures contained in Paragraph 3. To ensure that extension pressure is available, at least one of the two gear extension solenoids must be operable. Verification of nose gear steering and main landing gear door operation using hydraulic system C pressure is contained in Paragraph 4.

2. Referenced Procedures

24-00-00	Electrical Power - Maintenance Practices
29-11-00	Hydraulic Power System - Maintenance Practices
32-00-00	Landing Gear - Maintenance Practices
32-33-00	Main Landing Gear Inboard Door - Maintenance Practices

3. Deactivation

NOTE: This deactivation procedure applies only when an aircraft is to be dispatched in accordance with the MEL.

A. Retraction Function With DownLock Pins

- (1) Install and safety Landing gear downlock pins (Ref. 32-00-00).
- (2) Install LANDING GEAR RETRACTION INOPERATIVE placard next to landing gear control lever.
- (3) Make appropriate entry in aircraft log book.

B. Retraction Function With Control Switch Blocking Device

- (1) On aircraft 001-031 with SB32-130 and 032, 033, insert blocking pin in blocking pin clips on the landing gear control switch (Ref. Fig. 201).

NOTE: Do not separate electrical connector at landing gear control switch unless necessary in order to maintain electrical integrity of the system.

EFFECTIVITY: ALL

32-30-00
Page 201
May 15/85



MAINTENANCE MANUAL

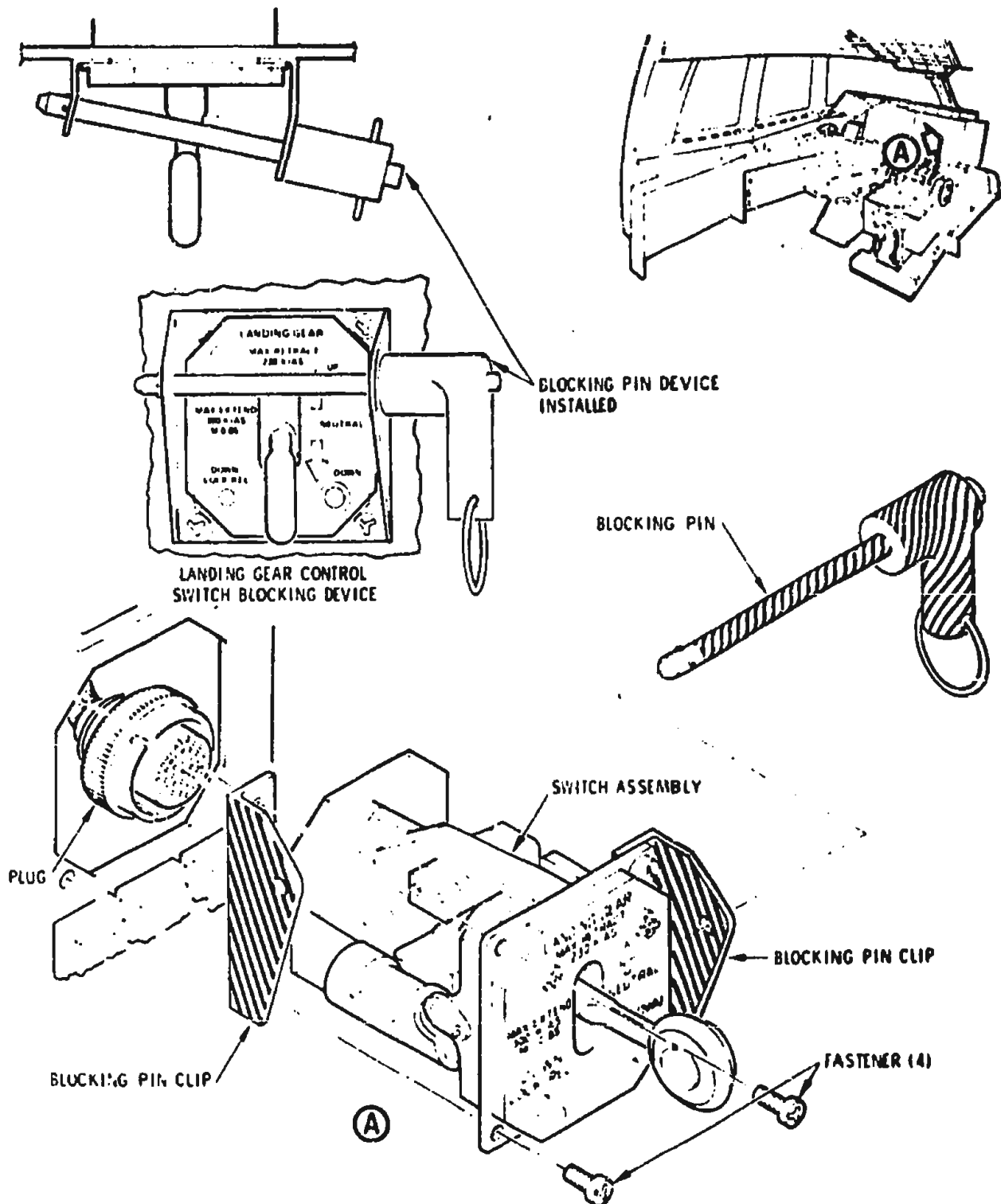
The Landing gear control switch blocking device may be used in lieu of downlock safety pins for GEAR EXTENDED REVENUE FLIGHT. Removal of the blocking pin permits landing gear retraction if required for ditching or aerodynamic clean up in an emergency.

4. Hydraulic System Test

A. Hydraulic System C

- (1) Verify that landing gear extension hydraulic pressure is available at nose and main gears as follows:
 - (a) Verify that all landing gear downlock safety pins are installed.
 - (b) Turn on electrical power (Ref. 24-00-00).
 - (c) Turn on hydraulic system C pressure (Ref. 29-11-00).
 - (d) Turn nose gear steering wheel in both directions while verifying that nose gear steering functions.
 - (e) Using ground control D-handles, open and close both main landing gear doors (Ref. 32-33-00).
 - (f) Turn off hydraulic system C pressure (Ref. 29-11-00).
 - (g) Visually inspect inboard door actuator uplocks to verify that doors are locked in up position.
 - (h) Turn off electrical power (Ref. 24-00-00).

LOCKHEED
MAINTENANCE MANUAL



MI-0100-32-855

Landing Gear Control Switch With Blocking Device
Figure 201

EFFECTIVITY: 001-031 WITH SB32-130 AND 032, 033

32-30-00
Page 203/204
May 15/82

R
R
001B

LOCKHEED
MAINTENANCE MANUAL

LANDING GEAR RETRACTION AND EXTENSION - ADJUSTMENT AND TEST

1. General

A. Test

This procedure contains instructions for performing landing gear retraction and extension for maintenance test purposes. In addition an operational test (door swing) is included to provide a means of checking the operation of the landing gear control components without retracting and extending the landing gear.

The landing gear control module manual shutoff valves must not be used to prevent actuation of any one or more landing gears.

If the nose landing gear only is to be retracted and extended, downlock safety pins must be installed in the main landing gear. When the main landing gear is not jacked off the deck, wheels shall be chocked forward and aft and chain binders should be installed.

CR If one or both of the main landing gear only is to be retracted and extended, jack entire aircraft per (7-11-00).

CR CR As applicable, a downlock safety pin shall be installed in all main landing gear not being extended and retracted. Both main landing gears shall be jacked high enough so that the tires are clear of the deck by at least 6 inches.

CR If only the main landing gear inboard doors are to be opened and closed using the landing gear control lever, downlock safety pins (secured) must be installed in all gears.

The procedures for landing gear retraction and extension are divided into two main categories; slow rate retraction and extension, and normal rate retraction and extension. These two categories are each divided into four lesser categories; nose landing gear, one main landing gear, both main landing gear, and all three landing gear.

The various procedures are contained in the following steps:

Nose landing gear slow rate - Step 4B(1).

One main landing gear slow rate - Step 4B(2).

Both main landing gear slow rate - Step 4B(3).

EFFECTIVITY: ALL

001B

32-30-00
Page 501
Nov 15/84

LOCKHEED
MAINTENANCE MANUAL

All landing gear slow rate - Step 4B(4).

Nose landing gear normal rate - Step 4B(5).

One main landing gear normal rate - Step 4B(6).

Both main landing gear normal rate - Step 4B(7).

All landing gear normal rate - Step 4B(8).

The operational procedure for opening and closing the main landing gear inboard doors using the LANDING GEAR control lever is contained in Step 4C.

Position indicator lights are located on the Flight Engineer/Second Officers annunciator panel.

Landing gear door indicator lights read LH GEAR DOOR, NOSE GEAR DOOR, and RH GEAR DOOR.

2. Equipment and Materials

Jacking Adapter Set, Spec Tool Co., PN STC 90517-17, or equivalent

Forward Fuselage Jack (30 ton capacity), Malabar Mfg. Co., Model 733, or equivalent

Wing Jack (100 ton capacity), Malabar Mfg. Co., Model 792B, or equivalent

Engine Run-up Chain Binder, PN BC97-101, or equivalent

3. Referenced Procedures

7-11-00 Wing and Fuselage Jacking - Maintenance Practices

24-00-00 Electrical Power - Maintenance Practices

29-11-00 Hydraulic Power System - Maintenance Practices

31-22-00 Proximity Switch Card Box and Proximity Logic Box - Maintenance Practices

32-31-02 Four-way, Three Position Solenoid Cartridge Valve - Maintenance Practices

32-33-00 Main Landing Gear Inboard Door - Maintenance

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EFFECTIVITY: ALL

32-30-00
Page 502
Nov 15/84

LOCKHEED
MAINTENANCE MANUAL

Practices

33-17-00 Indicator Lights Test - Maintenance Practices

4. Adjustment/Test

A. Preliminary Procedures

- (1) Ensure that downlock safety pins are installed in all three landing gears.
- (2) Jack aircraft as required by the landing gear retraction and extension to be performed (Ref. 7-11-00).
- (3) Turn on electrical power (Ref. 24-00-00).

WARNING: **VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:**

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (4) Turn on hydraulic system C pressure using a flow-rate-controllable pressure source (Ref. 29-11-00).
- (5) Establish communications between ground observer and flight station.
- (6) Ensure that the following controls are in positions indicated:

LOCATION	CONTROL	POSITION
Pilots Instrument Panel	LANDING GEAR	DOWN
Pilots Lower Pedestal	LANDING GEAR UPLOCK MECHANICAL RELEASES	IN
Pilots Lower Pedestal	EMERGENCY HYDRAULIC LANDING GEAR EXTENSION	NORM (Guarded)

R
R
001B

EFFECTIVITY: ALL

32-30-00
Page 503
Nov 15/84

LOCKHEED
MAINTENANCE MANUAL

LOCATION	CONTROL	POSITION
Flight Eng/Second Off Hydraulic Control Panel	HYDRAULIC SYSTEM Switches	OFF
Hydraulic Service Center Panel	Switches	OFF
Hydraulic Service Center Landing Gear Control Module	Manual Shutoff Valves	Fully Counterclockwise
Bottom of Fuselage Forward of MLG Inboard Door, Zone 149, FS 1163, and BL 47.84	MAIN WHEEL WELL DOOR D-Handle	Stowed (Up)

(7) Ensure that the following circuit breakers are closed and tagged:

(a) Flight Engineer/Second Officers CB2 circuit breaker panel:

GEAR CONT NO. 1 (F17)

GEAR CONT NO. 2 (F18)

IND LT F/E PANEL LOWER (J4)

IND LT F/E PANEL UPPER (J3)

IND LT PILOTS (J2)

MLG GND SENSE (L8)

TRUCK LEVEL (F16)

HYDRAULIC INDICATORS PRESS (M13)

F/E IND LT TEST 1 (H1)

F/E IND LT TEST 2 (H2)

F/E IND LT TEST 3 (H3)

F/E IND LT TEST 4 (H4)

R
R
0018

EFFECTIVITY: ALL

32-30-00
Page 504
Aug 15/82

LOCKHEED
MAINTENANCE MANUAL

F/E IND LT TEST 5 (H5)

PILOTS IND LT TEST 1 (H8)

PILOTS IND LT TEST 2 (H9)

PILOTS IND LT TEST 3 (H10)

(b) Pilots overhead CB1 circuit breaker panel:

PROX SW PWR NO. 1 (L10)

PROX SW PWR NO. 4 (L11)

DOOR POSN IND (L13)

- (8) On Flight Engineer/Second Officers CB2 circuit breaker panel, ensure that TAIL SKID CONT (F12) and TAIL SKID IND (F13) circuit breakers are open and tagged.**
- (9) On pilots overhead CB1 circuit breaker panel, ensure that LAND GEAR WARN HORN (L12) circuit breaker is open and tagged.**
- (10) Perform BITE check of proximity switch card box and proximity logic box (Ref. 31-22-00).**
- (11) Perform indicator lights test using WARN/CAUTION/ADVISORY LIGHTS TEST switch on pilots overhead panel and Flight Engineer/Second Officers panel (Ref. 33-17-00).**

B. Operational Tests (Gear Swing)

(1) Perform nose landing gear slow rate retraction and extension as follows:

- (a) When required to prevent a swinging door hazard, pull D-handles to open both MLG doors, install MLG door actuator locks on both MLG door actuators (Ref. 32-33-00), and restow D-handle.**
- (b) Position suitable barriers and warning indicators around nose landing gear area.**
- (c) Set flow rate of hydraulic pressure source to 5 gpm.**
- (d) Remove downlock safety pin from nose landing gear.**
- (e) Ensure that nose landing gear area is clear of personnel and equipment.**

EFFECTIVITY: ALL

32-30-00
Page 505
May 15/89

001B



MAINTENANCE MANUAL

CAUTION: OBSERVATION OF LANDING GEAR DURING RETRACTION AND EXTENSION MUST BE PRACTICED ALONG WITH CONSTANT COMMUNICATION BETWEEN FLIGHT STATION AND OBSERVERS IN ORDER TO PREVENT DAMAGE DUE TO MALFUNCTION OR MISALIGNMENT.

- (f) Position landing gear control lever to UP.
- (g) Allow landing gear to retract as far as required.
- (h) Position landing gear control lever to NEUTRAL to stop retraction as required.

NOTE: Gear may not retain position.

- (i) As required, position landing gear control lever to DOWN.

NOTE: When landing gear has reached the fully extended position, the landing gear control lever must remain in the DOWN position until retraction is again performed.

- (j) Install NLG downlock safety pin.
- (k) As required, remove MLG door actuator locks and close both MLG inboard doors (Ref. 32-33-00).
- (l) Perform completion procedures, as required, contained in Step 4(D).

- (2) Perform a one main landing gear slow rate extension and retraction as follows:

- (a) Verify that hydraulic system C pressure is on (Ref. 29-11-00).
- (b) When required to prevent swinging door hazard, pull D-handle to open MLG door of landing gear not being extended and retracted (Ref. 32-33-00).
- (c) Install MLG door actuator lock as required (Ref. 32-33-00), and stow D-handle.
- (d) Position suitable barriers and warning indicators around main landing gear area.
- (e) Set flow rate of hydraulic pressure source to 13.5 gpm.
- (f) Remove downlock safety pin from main landing gear being actuated.

EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL

- (g) Ensure that main landing gear area is clear of personnel and equipment and pilots instrument panel TRUCK light is off.

R

CAUTION: OBSERVATION OF LANDING GEAR DURING RETRACTION AND EXTENSION MUST BE PRACTICED ALONG WITH CONSTANT COMMUNICATION BETWEEN FLIGHT STATION AND OBSERVERS IN ORDER TO PREVENT DAMAGE DUE TO MALFUNCTION OR MISALIGNMENT.

- (h) Position landing gear control lever to UP.
(i) Allow landing gear to retract as far as required.
(j) Position landing gear control lever to NEUTRAL to stop retraction as required.

NOTE: Gear may not retain position.

- (k) As required, position landing gear control lever to DOWN.

NOTE: When landing gear has reached the fully extended position, the landing gear control lever must remain in the DOWN position until retraction is again performed.

- (l) Install MLG downlock pin or pins as applicable.
(m) As required, remove door actuator lock or locks and close door or doors (Ref. 32-33-00).
(n) Perform completion procedures, as required, contained in Step 4D.
- (3) Perform slow rate retraction and extension of both main landing gear as follows:
- (a) Verify that hydraulic system C pressure is on (Ref. 29-11-00).
(b) Position suitable barriers and warning indicators around both main landing gear areas.
(c) Set flow rate of hydraulic pressure source to 25 gpm.
(d) Remove both main landing gear downlock safety pins.

EFFECTIVITY: ALL

001B

32-30-00
Page 507
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL

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- (e) Ensure that main landing gear area is clear of personnel and equipment and pilots instrument panel TRUCK light is off.

CAUTION: OBSERVATION OF LANDING GEAR DURING RETRACTION AND EXTENSION MUST BE PRACTICED ALONG WITH CONSTANT COMMUNICATION BETWEEN FLIGHT STATION, AND OBSERVERS IN ORDER TO PREVENT DAMAGE DUE TO MALFUNCTION OR MISALIGNMENT.

- (f) Position landing gear control lever to UP.
- (g) Allow landing gear to retract as far as required.
- (h) Position landing gear control lever to NEUTRAL to stop retraction as required.

NOTE: Gear may not retain position.

- (i) As required, position Landing gear control lever to DOWN.

NOTE: When landing gear has reached the fully extended position, the landing gear control lever must remain in the DOWN position until retraction is again performed.

- (j) Install MLG downlock safety pins.
 - (k) Perform completion procedures, as required, contained in Step 4D.
- (4) Perform slow rate retraction and extension of nose landing gear and both main landing gear as follows:
- (a) Verify that hydraulic system C pressure is on (Ref. 29-11-00).
 - (b) Position suitable barriers and warning indicators around all three landing gear areas.
 - (c) Set flow rate of hydraulic pressure source at 28 gpm.
 - (d) Remove downlock safety pins from nose landing gear and both main landing gear.
 - (e) Ensure that all three landing gear areas are clear of personnel and equipment and pilots instrument panel TRUCK light is off.

EFFECTIVITY: ALL

001B

32-30-00
Page 508
Nov 15/84



MAINTENANCE MANUAL

CAUTION: OBSERVATION OF LANDING GEAR DURING RETRACTION AND EXTENSION MUST BE PRACTICED ALONG WITH CONSTANT COMMUNICATION BETWEEN FLIGHT STATION AND OBSERVERS IN ORDER TO PREVENT DAMAGE DUE TO MALFUNCTION OR MISALIGNMENT.

- (f) Position landing gear control lever to UP.
- (g) Allow landing gear to retract as far as required.
- (h) Position landing gear control lever to NEUTRAL to stop retraction as required.

NOTE: Gear may not retain position.

- (i) As required, position landing gear control lever to DOWN.

NOTE: When landing gear has reached the fully extended position, the landing gear control lever must remain in the DOWN position until retraction is again performed.

- (j) Install NLG and MLG downlock safety pins.
 - (k) Perform completion procedures, as required, contained in Step 4D.
- (5) Perform normal rate retraction and extension of nose landing gear as follows:
- (a) Verify that hydraulic system C pressure is on (Ref. 29-11-00).
 - (b) When required to prevent swinging door hazard, pull D-handles to open both MLG doors, install MLG door actuator locks on both MLG door actuators (Ref. 32-33-00), restow D-handles.
 - (c) Position suitable barriers and warning indicators around nose landing gear area.
 - (d) Set flow rate of hydraulic pressure source at 10 gpm.
 - (e) Remove downlock safety pin from nose landing gear.
 - (f) Ensure that nose landing gear area is clear of personnel and equipment.

EFFECTIVITY: ALL

32-30-00

Page 509
May 15/89

LOCKHEED
MAINTENANCE MANUAL

R

CAUTION: OBSERVATION OF LANDING GEAR DURING RETRACTION AND EXTENSION MUST BE PRACTICED ALONG WITH CONSTANT COMMUNICATION BETWEEN FLIGHT STATION AND OBSERVERS IN ORDER TO PREVENT DAMAGE DUE TO MALFUNCTION OR MISALIGNMENT.

(g) Position landing gear control lever to UP. At end of retraction, NLG should be up and locked.

(h) Check for the following light indications:

Pilots Instrument Panel

NOSE GEAR - Off

RIGHT GEAR - On

LEFT GEAR - On

DOOR - On

IN TRANS - On

TRUCK - Off

Flight Engineer/Second Officers Annunciator Panel

LH GEAR DOOR - On

NOSE GEAR DOOR - Off

RH GEAR DOOR - On

(i) Position landing gear control lever to NEUTRAL.

(j) NLG shall remain up and locked.

(k) Position landing gear control lever to DOWN.

NOTE: When landing gear has reached the fully extended position, the landing gear control lever must remain in the DOWN position until retraction is again performed.

(l) Install NLG downlock safety pin.

(m) As required, remove door actuator locks and close both MLG inboard doors (Ref. 32-33-00).

(n) Perform completion procedures, as required, contained in Step 4D.

EFFECTIVITY: ALL

32-30-00
Page 510
Aug 15/81

001B



MAINTENANCE MANUAL

(6) Perform normal rate retraction and extension of one main landing gear as follows:

- (a) Verify that hydraulic system C pressure is on (Ref. 29-11-00).
- (b) When required to prevent swinging door hazard, open MLG inboard door not being retracted and install MLG door actuator lock (Ref. 32-33-00).
- (c) Position suitable barriers and warning indicators around main landing gear area.
- (d) Set flow rate of hydraulic pressure source to 30 gpm.
- (e) Remove downlock safety pin from main landing gear being actuated.
- (f) Ensure that main landing gear area is clear of personnel and equipment and pilots instrument panel TRUCK Light is off.

CAUTION: OBSERVATION OF LANDING GEAR DURING EXTENSION AND RETRACTION MUST BE PRACTICED ALONG WITH CONSTANT COMMUNICATION BETWEEN FLIGHT STATION AND OBSERVERS IN ORDER TO PREVENT DAMAGE TO AIRCRAFT DUE TO MALFUNCTION OR MISALIGNMENT.

- (g) Position landing gear control lever to UP. At end of retraction, MLG should be up and locked.
- (h) Check for following light indications:

Pilots Instrument Panel

RIGHT GEAR or LEFT GEAR (retracted gear) - Off
 LEFT GEAR or RIGHT GEAR (not retracted gear) - On
 DOOR - On
 IN TRANS - On
 TRUCK - Off

Flight Engineer/Second Officers Annunciator Panel

LH GEAR DOOR or RH GEAR DOOR (retracted gear) - Off

R EFFECTIVITY: ALL

001B

32-30-00
 Page 511
 Aug 15/82

LOCKHEED
MAINTENANCE MANUAL

NOSE GEAR DOOR - On

RH GEAR DOOR or LH GEAR DOOR (not retracted gear) - On

- (i) Verify that MLG visual downlock indicator is flush with wing upper surface when gear is retracted.
- (j) Position landing gear control lever to NEUTRAL.
- (k) Landing gear shall remain up and locked.
- (l) Position landing gear control lever to DOWN.

NOTE: When landing gear has reached the fully extended position, the landing gear control lever must remain in the DOWN position until retraction is again performed.

- (m) Install MLG downlock safety pin.
 - (n) Verify that MLG visual downlock indicator is popped up above wing upper skin when MLG is down.
 - (o) As required, remove door actuator lock and close MLG inboard door (Ref. 32-33-00).
 - (p) Perform completion procedures, as required, contained in Step 4D.
- (7) Perform normal rate retraction and extension of both main landing gears as follows:
- (a) Set flow rate of hydraulic pressure source at 50 gpm.
 - (b) Remove downlock safety pins from both main landing gears.
 - (c) Ensure that main landing gear area is clear of personnel and equipment, and pilots instrument panel TRUCK light is off.

CAUTION: OBSERVATION OF LANDING GEAR DURING EXTENSION AND RETRACTION MUST BE PRACTICED ALONG WITH CONSTANT COMMUNICATION BETWEEN FLIGHT STATION AND OBSERVERS IN ORDER TO PREVENT DAMAGE TO AIRCRAFT DUE TO MALFUNCTION OR MISALIGNMENT.

- (d) Position landing gear control lever to UP. At end of retraction, MLG should be up and locked.

EFFECTIVITY: ALL

001B

32-30-00
Page 512
Nov 15/84

LOCKHEED
MAINTENANCE MANUAL

(e) Check for following light indications:

Pilots Instrument Panel

RIGHT GEAR - Off

LEFT GEAR - Off

DOOR - Off

IN TRANS - On

TRUCK - Off

Flight Engineer/Second Officers Annunciator Panel

LH GEAR DOOR - Off

NOSE GEAR DOOR - On

RH GEAR DOOR - Off

(f) Verify that MLG visual downlock indicators are flush with wing upper surface when gear is retracted.

(g) Position landing gear control lever to NEUTRAL.

(h) Landing gear shall remain up and locked.

(i) Position landing gear control lever to DOWN.

NOTE: When landing gear has reached the fully extended position, the landing gear control lever must remain in the DOWN position until retraction is again performed.

(j) Install MLG downlock safety pins.

(k) Verify that MLG visual downlock indicator is popped up above wing upper skin when MLG is down.

(l) Perform completion procedures, as required, contained in Step 4D.

(8) Perform normal rate retraction and extension of all three landing gears as follows:

NOTE: Retraction/Extension time shall not exceed 14 seconds.

EFFECTIVITY: ALL

001B

32-30-00
Page 513
Nov 15/84



MAINTENANCE MANUAL

- (a) Set flow rate of hydraulic pressure source at 55 gpm.
- (b) Remove downlock safety pins from nose and both main landing gears.
- (c) Ensure that main landing gear area is clear of personnel and equipment, and pilots instrument panel TRUCK light is off.

CAUTION: OBSERVATION OF LANDING GEAR DURING EXTENSION AND RETRACTION MUST BE PRACTICED ALONG WITH CONSTANT COMMUNICATION BETWEEN FLIGHT STATION AND OBSERVERS IN ORDER TO PREVENT DAMAGE TO AIRCRAFT DUE TO MALFUNCTION OR MISALIGNMENT.

- (d) Position landing gear control lever to UP. At end of retraction all landing gears should be up and locked.
- (e) Check for following light conditions:

Pilots Instrument Panel

NOSE GEAR - Off

RIGHT GEAR - Off

LEFT GEAR - Off

DOOR - Off

IN TRANS - Off

TRUCK - Off

Flight Engineer/Second Officers Annunciator Panel

LH GEAR DOOR - Off

NOSE GEAR DOOR - Off

RH GEAR DOOR - Off

- (f) Verify that MLG visual downlock indicators are flush with wing upper surface when gear is retracted.
- (g) Position landing gear control lever to NEUTRAL.
- (h) Landing gear shall remain up and locked.

R EFFECTIVITY: ALL

R
001B**32-30-00**
Page 514
Nov 15/84

LOCKHEED
MAINTENANCE MANUAL

(i) Position landing gear control lever to DOWN.

NOTE: When landing gear has reached the fully extended position, the landing gear control lever must remain in the DOWN position until retraction is again performed.

(j) Install NLG and MLG downlock safety pins.

R (k) Verify that MLG visual downlock indicator is
R popped up above wing upper skin when MLG is down.

R (l) Perform completion procedures, as required,
contained in Step 40.

R (9) Perform test of four-way, three-position solenoid
R cartridge valve in adjustment and test (Ref. 32-31-02).

C. Operational Test (Door Swing)

NOTE: The following procedural steps are to be performed only when specified in a removal and installation procedure or maintenance practice.

(1) Ensure that NLG and MLG downlock safety pins are installed, the red streamers are wrapped around the jury braces and downlock safety pins, and turns of lock-wire are used to secure streamers and pins in place so there is no possibility of the downlock safety pins being inadvertently removed.

CR (2) Deleted.

(3) Verify that hydraulic system C pressure is on (Ref. 29-11-00).

(4) Verify that electrical power is on (Ref. 24-00-00).

(5) Ensure that MLG inboard doors are closed (Ref. 32-33-00).

(6) Ensure that MLG door area is clear of personnel and equipment.

(7) On pilots center instrument panel, place LANDING GEAR control lever to UP position. Doors should open.

C NOTE: NLG and MLG green lights may extinguish with
C control lever in UP position.

(8) Place lever to DOWN position. Doors should close.

EFFECTIVITY: ALL

001B

32-30-00
Page 515
Nov 15/84



MAINTENANCE MANUAL

- (9) Perform completion procedures, as required, contained in Steps 4D(1), (2), (6), and (7).

D. Completion Procedures

- (1) Turn off hydraulic system C pressure (Ref. 29-11-00).
(2) Turn off electrical power (Ref. 24-00-00).
(3) Remove tags installed in Step 4A(7).
(4) Close circuit breakers and remove tags called out in Step 4A(8).
(5) Close circuit breakers and remove tag called out in Step 4A(9).
(6) Ensure that LANDING GEAR control lever is in DOWN position.
(7) Ensure that downlock safety pins are installed in NLG and both MLG.
CR (8) Deleted.

EFFECTIVITY: ALL

001B

32-30-00
Page 516
Nov 15/84

LANDING GEAR CONTROL SYSTEM - DESCRIPTION AND OPERATION**1. General**

The landing gear control system is electrically energized to actuate the landing gear selector valve; thereafter, mechanical articulation by the movement of the landing gear doors and the landing gear results in positioning other control valves to complete the sequences of operation for each condition. Two components initiate the control: the landing gear control switch (Ref. Fig. 1, 2, and 3) and the main landing gear hydraulic four-way, three-position, solenoid cartridge valve (selector valve). The landing gear control switch is installed on the right side of the pilots center instrument panel, in zone 210. The landing gear control module, in which the electrically actuated control valve is installed, is located in the hydraulic service center, zone 147 (Ref. Fig. 1).

- R A hydraulic fuse module assembly (Ref. Fig. 9) is located on the forward wall of the hydraulic service center (zone 147).

2. Operation

When the landing gear control switch is in the DOWN position (Ref. Fig. 4), 28V dc from dc buses No. 2 and No. 3 is connected to the Z1 and Z2 solenoids of the landing gear selector valve. Actuation of the valve turns the valve orifices in a position to connect the system C hydraulic pressure (normal) into the landing gear hydraulic system. When the landing gear control switch is in the UP position, 28V dc is applied to the W1 and W2 solenoids of the landing gear selector valve. In this condition, the hydraulic pressure is routed to the landing gear hydraulic system to begin the gear-up cycle. When the landing gear control switch is placed in the NEUTRAL position, voltage from the landing gear selector valve solenoids is removed and the spring-loaded valve returns to the normal (NEUTRAL) position.

3. Module Assembly**A. Description**

The landing gear control module (Ref. Fig. 5) is a compact, cast-aluminum manifold that houses the following components:

A hydraulic four-way three-position solenoid cartridge valve (selector valve)

EFFECTIVITY: ALL

32-31-00

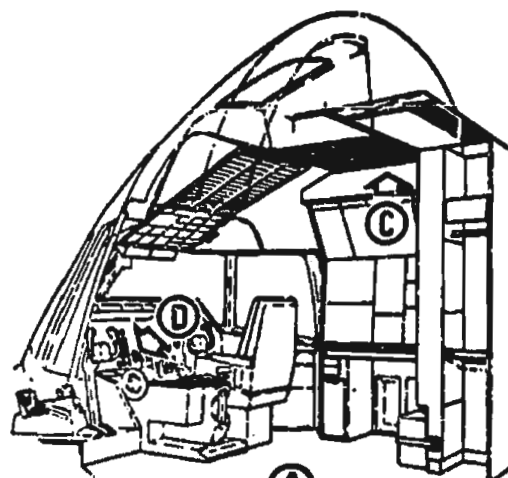
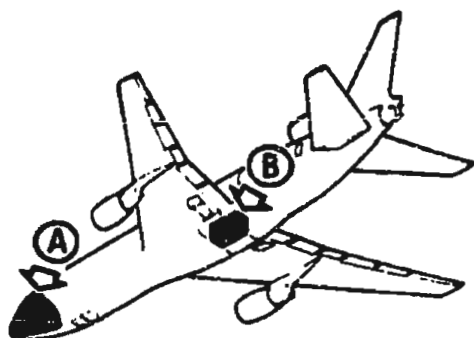
Page 1
Nov 15/88

001B

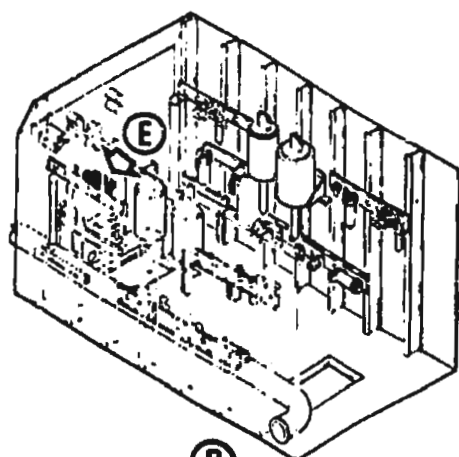
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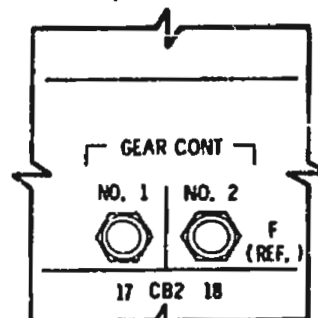
MAINTENANCE MANUAL



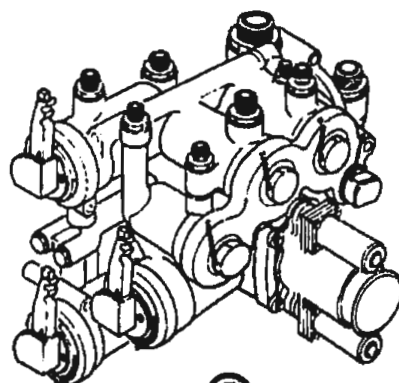
(A)
FLIGHT STATION
ZONE 210



(B)
HYDRAULIC SERVICE CENTER

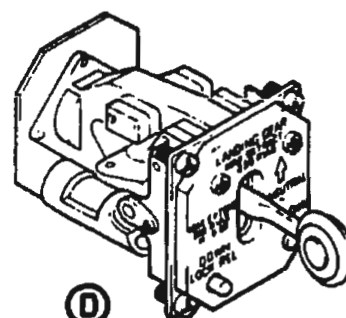


(C)
FLIGHT ENGINEER/SECOND OFFICERS
OVERHEAD CIRCUIT BREAKER PANEL



(E)
LANDING GEAR CONTROL MODULE

FOUR WAY THREE
POSITION SOLENOID VALVE



(D)
LANDING GEAR CONTROL LEVER HH 6642
M1-0101-32-159

Landing Gear Control Electrical Components Locator Figure 1

EFFECTIVITY: ALL

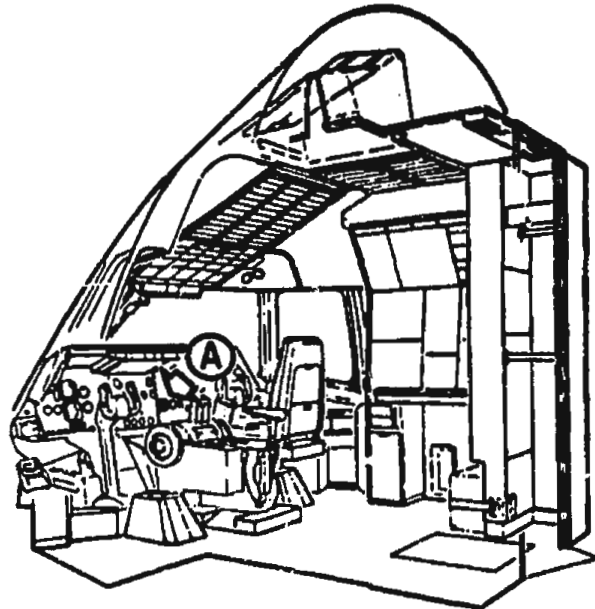
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Page 2
Sep 15/79

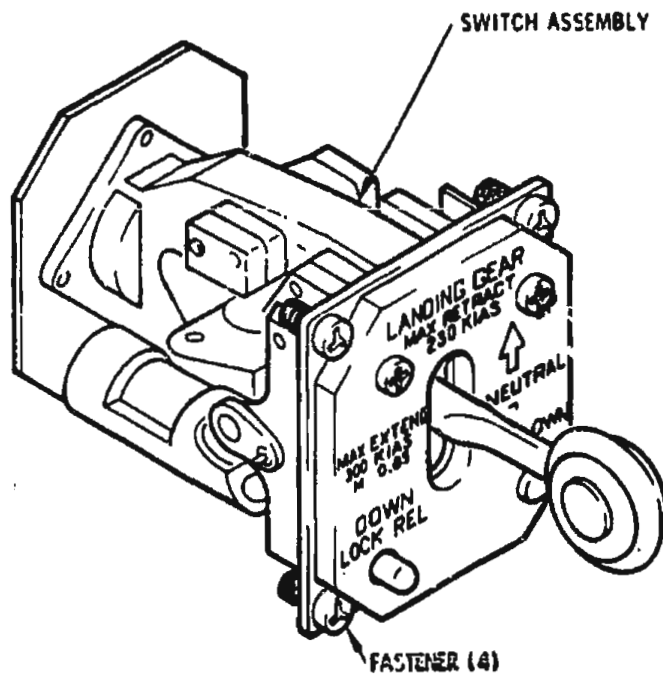
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LOCKHEED
MAINTENANCE MANUAL



**FLIGHT STATION
 ZONE 210**



A

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**Landing Gear Control
 Figure 2**

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R EFFECTIVITY: ALL
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001B

32-31-00
 Page 3
 Sep 15/79



MAINTENANCE MANUAL

Three flow regulator cartridge valves

A manually operated bypass selector valve

Three manual shutoff cartridge valves

A pressure regulator cartridge valve (Ref. 32-43-16)

The module is located in the forward end of the hydraulic service center, zone 147.

4. Hydraulic, Four-way, Three-position, Solenoid Cartridge Valve (Selector Valve)

A. Description

The four-way, three-position, solenoid cartridge valve (selector valve) functions as the control for hydraulic system C pressure in the landing gear system (Ref. Fig. 7). The selector valve selects conditions that direct hydraulic pressure to operate the landing gears and landing gear doors, the truck positioner, and the nose wheel steering system. The selector valve consists of two solenoids, two independent mechanical trains, and one pilot valve to drive the main valve. The selector valve, which is part of the landing gear control module assembly, is installed in the hydraulic service center, zone 147.

5. Hydraulic Flow Regulator Cartridge Valve

A. Description

The flow regulator cartridge valve (Ref. Fig. 5) is used to control the flow rate of hydraulic fluid in the landing gear system. There are three valves installed in the landing gear control module. Two identical valves control flow in either direction for the main gears during travel up and down at 23 gpm for symmetrical inboard door operation. The third valve controls flow in one direction at 6 gpm to achieve simultaneous retraction of the nose gear and the main gear.

B. Operation

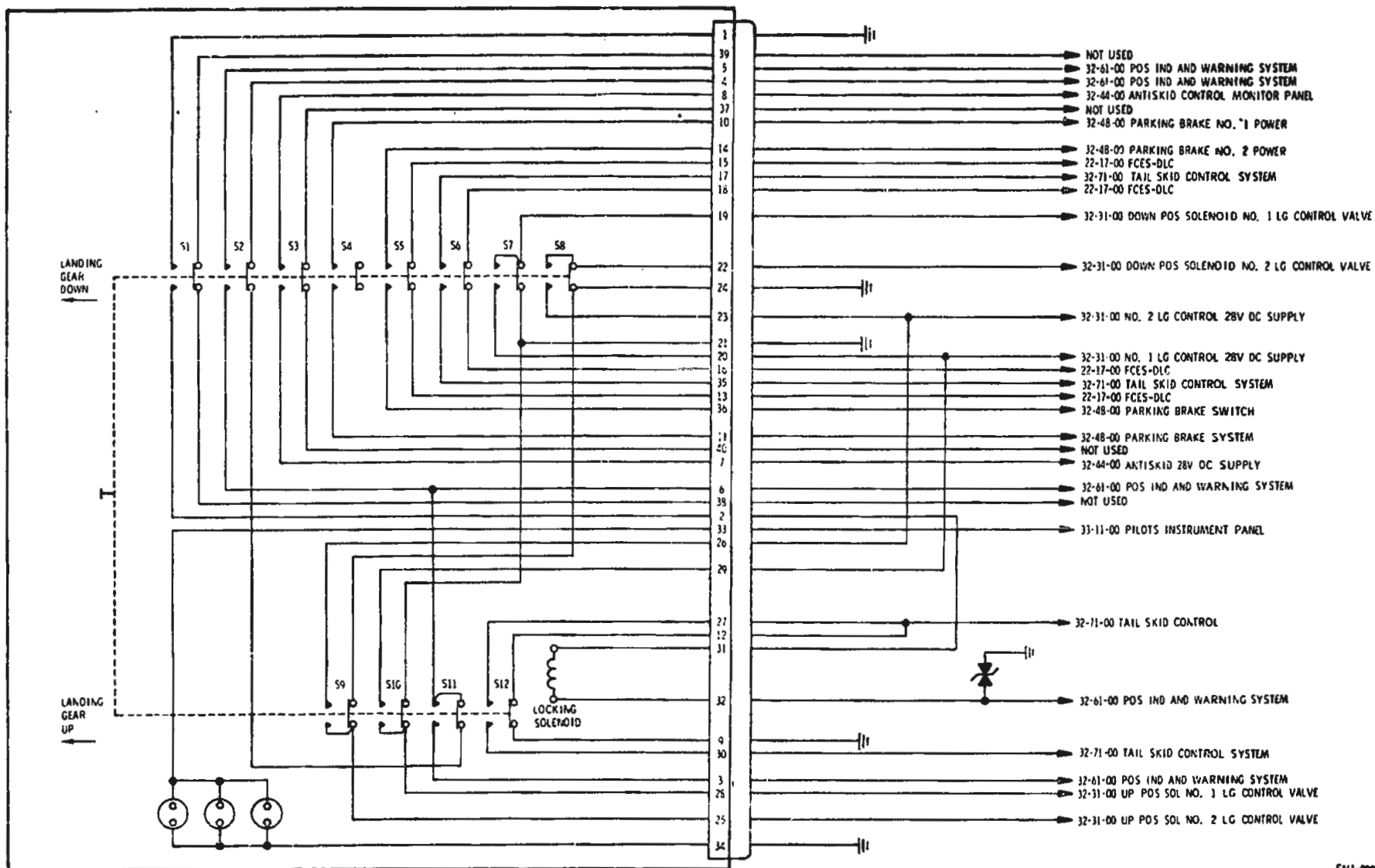
Flow regulation is performed by a sensing orifice in a spring-loaded piston. The pressure drop caused by flow through the piston acts on the effective area of the piston. The spring force rate results in a controlled port either upstream or downstream of the orifice depending on the direction of flow. Thus, the valve consists of two

R EFFECTIVITY: ALL

001B

32-31-00

Page 4
Nov 15/88



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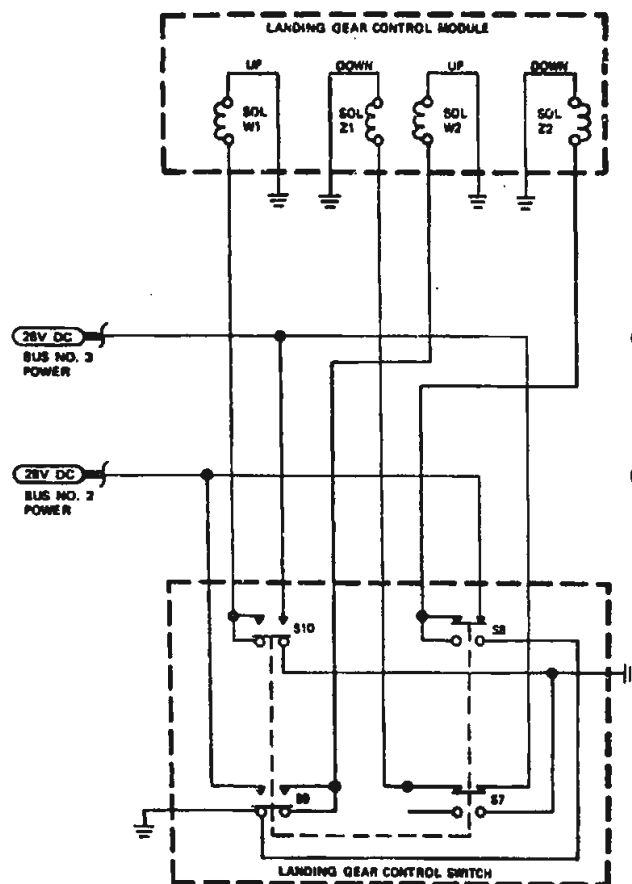
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Landing Gear Control Electrical Schematic (NEUTRAL Position)
Figure 3

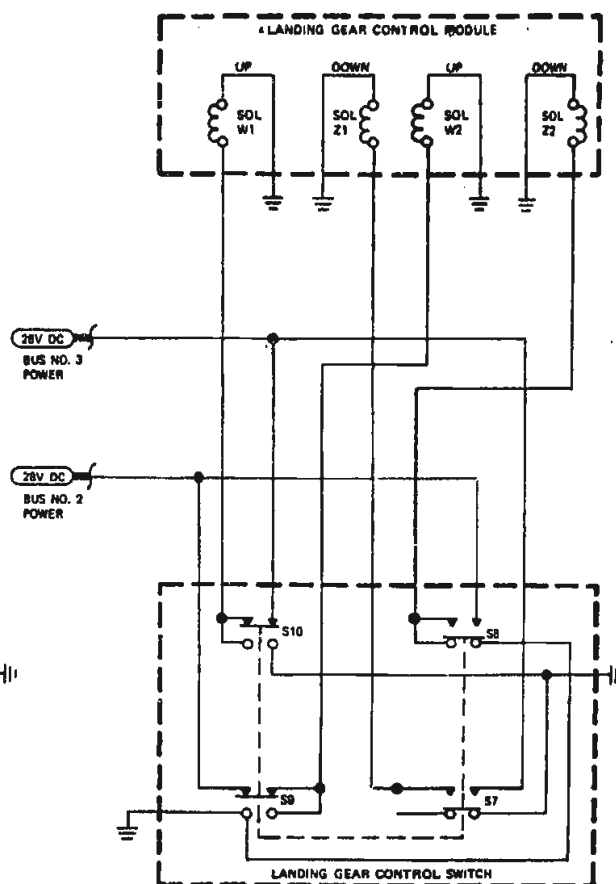
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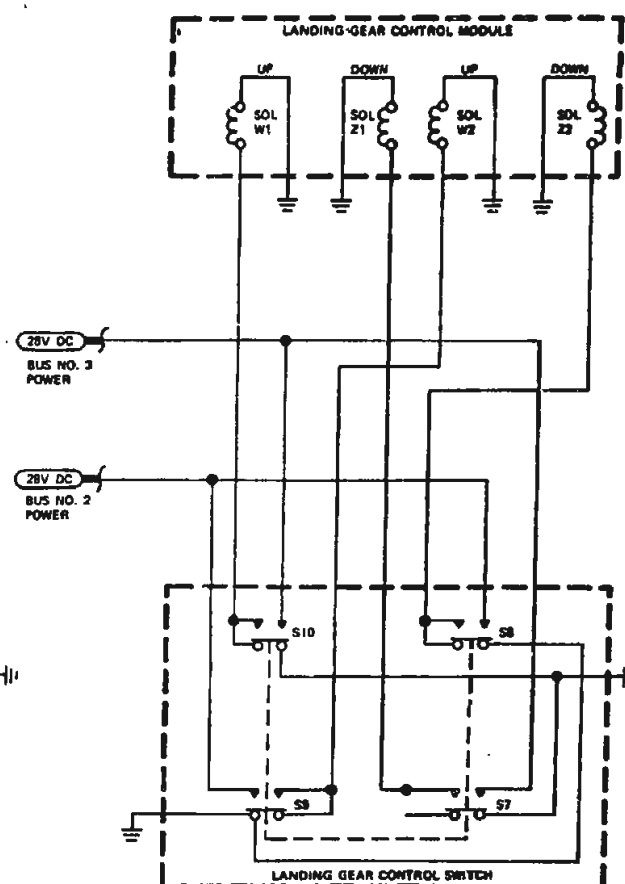
32-31-00
Page 5/6
May 15/87



NOTE
LANDING GEAR CONTROL SWITCH
IN DOWN POSITION



NOTE
LANDING GEAR CONTROL SWITCH
IN UP POSITION



NOTE
LANDING GEAR CONTROL SWITCH
IN NEUTRAL POSITION

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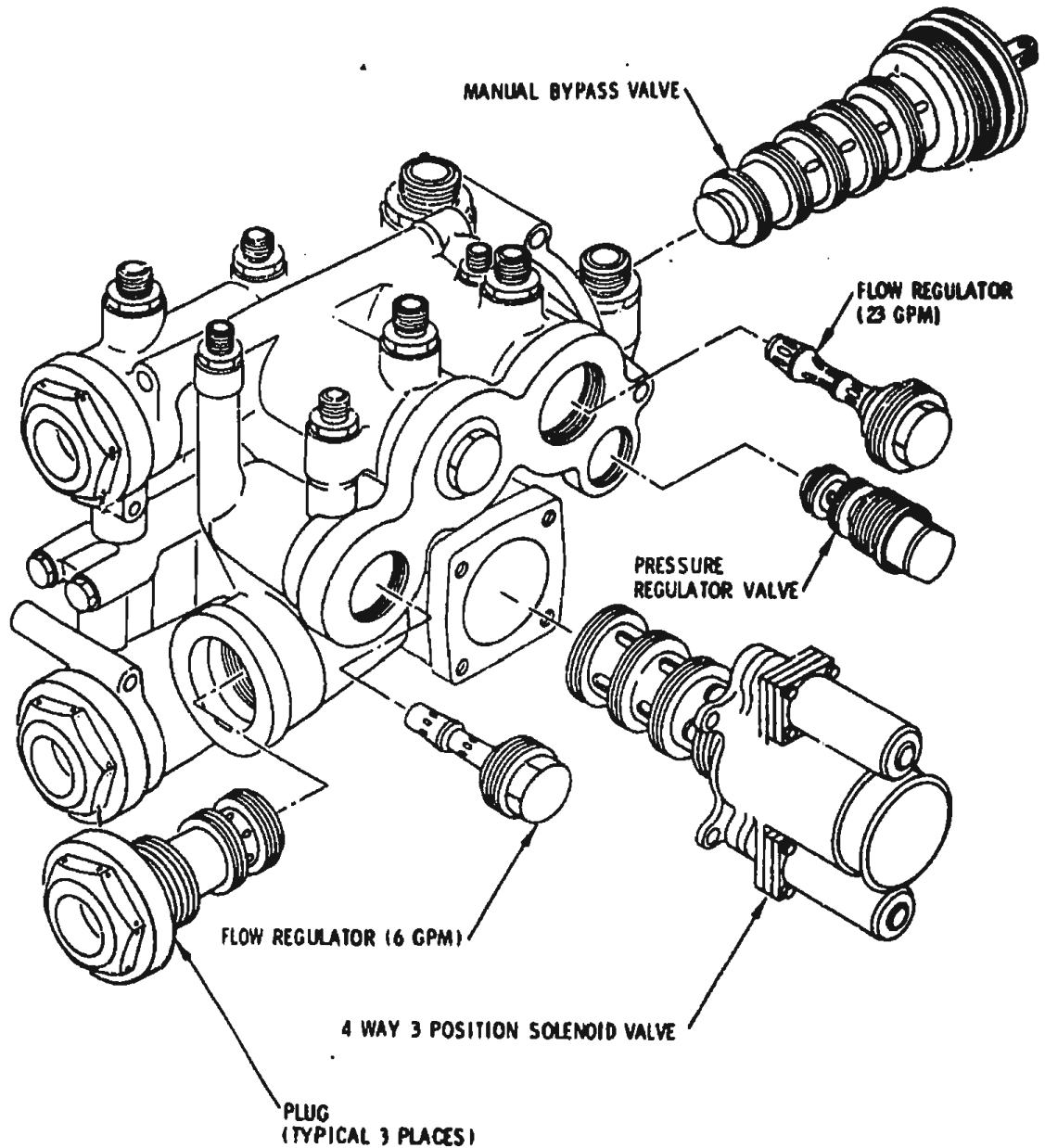
Landing Gear Control System Simplified Electrical Schematic
Figure 4

EFFECTIVITY: ALL

0018

32-31-00
Page 7/8
Nov 15/83

LOCKHEED
MAINTENANCE MANUAL



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Landing Gear Control Module
Figure 5

EFFECTIVITY: ALL

001B

32-31-00
Page 9
Jul 15/83



orifices: one fixed and one variable. The fixed orifice senses the flow, while the variable orifice adjusts the flow.

6. Manually Operated Bypass Selector Cartridge Valve

A. Description

The manually operated bypass selector cartridge valve (Ref. Fig. 5) is a lapped, spool-and-sleeve-type cartridge valve that is installed in the landing gear control module. The valve is designed to bypass fluid in the landing gear hydraulic system when required for mechanical alternate free-fall gear extension. The valve is operated by an external force acting on the clevis tang that protrudes from the landing gear control module. A locking feature is included to protect against inadvertent operation. The tang must be moved to unlock the spool and allow the additional movement for the valve to bypass. Internal flow forces acting on the valve cannot unlock the spool.

B. Operation

The valve spool is normally in the locked position. In the locked position, the pressure port is connected to the up

FIGURE DELETED

MI-000-SP-FGD

Manual Shutoff Cartridge Valve
Figure 6

32-31-00
Page 10
Nov 15/88

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R
001B

EFFECTIVITY: ALL



port, and both the down and return ports are blocked. When the spool tang is extended manually 0.1 inch from the normal position, the spool is unlocked to move to the bypass position. Further extension of the tang through a full stroke of 0.6 inch (bypass position) blocks the pressure port and connects the up, down, and return ports. When the tang is released the spring automatically returns the spool to the normally locked position.

CR 7. Manual Shutoff Valve Plug

A. Description

C Three identical manual shutoff valve plugs (Ref. Fig. 5) are
 C mounted in the landing gear control module located in the
 C hydraulic service center, zone 147. The plugs replace
 C manual shutoff cartridge valves which were replaced by M.O.
 C Note the following warning and precaution highlight problems
 C which could occur if a manual shutoff cartridge valve were
 C to be installed or if a landing gear control module (with
 C manual shutoff cartridge valves) were borrowed from another
 C operator.

C **WARNING:** NOSE GEAR OPERATION WILL OCCUR WITH MANUAL
 C SHUT-OFF CARTRIDGE VALVE CLOSED AND HYDRAULIC
 C PRESSURE APPLIED TO LDG UP SYSTEM.

C The closed position will not prevent nose gear retraction or
 C partial opening of the MLG doors. If the nose gear is
 C retracted with the valve closed, the nose gear will not
 C extend when the landing gear selector handle is positioned
 C to "DOWN". The valves are installed in "DOWN" pressure
 C circuit of the landing gear control module.

R 8. Main Landing Gear Downlock Shuttle Valve

A. Description and Operation

The main landing gear (MLG) downlock shuttle valve (Ref. Fig. 8) is bolted to the MLG downlock actuator. The valve functions automatically to direct pressure from a normal (hydraulic system C) or an alternate (system C alternate brake system accumulator) pressure source to the downlock actuator.

The valve has two inlet pressure ports of equivalent flow capacity, and one shuttle port. The valve shifts flow from either inlet port to the shuttle port when actuated by a pressure differential across the inlet ports. A vent port common with the shuttle port is included. Once moved by

EFFECTIVITY: ALL

001B

32-31-00
 Page 11
 Dec 15/93



pressure from either source, a spring-loaded ball detent maintains the shuttle valve in a positive position.

R 9. Vacuum-controlled Check Valve

A. Description and Operation

The vacuum-controlled check valve (Ref. Fig. 8) consists of an anodized aluminum body containing a steel poppet and slide assembly, and a rubber diaphragm. The valve works in the return line as a normal check valve to permit fluid to flow from the landing gear to the reservoir, but not back to the landing gear. The valve also prevents complete system fluid loss in the event of hydraulic tube damage in the wheel well. A free-fall extension of the landing gear would normally require fluid to flow through the system from the reservoir to the landing gear. This valve permits the flow without severe cavitation that would be caused by a standard check valve. The pressure-sensing element in the valve compares atmospheric pressure to the landing gear system pressure. When the system pressure is below atmospheric pressure, the valve opens and permits reverse flow. Since the valve senses only equal pressure, a line failure in the wheel well will not open the valve.

FIGURE DELETED

MI-000-SP-FGD

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Manual Shutoff Cartridge Valve Mechanical Interlock Assembly
Figure 7

EFFECTIVITY: ALL

001B

32-31-00
Page 12
Dec 15/93

R 10. Main Landing Gear Manifolded Check Valve**A. Description and Operation**

Two check valves (Ref. Fig. 8) are manifolded in a T-fitting with a single inlet and two outlets. Each valve allows free flow in one direction, and checks reverse flow from each outlet back to the inlet. The manifolded check valves is located in the hydraulic service center, zone 147.

R 11. Landing Gear Control**A. Description**

The landing gear control (Ref. Fig. 2) is a multiple-contact switch assembly that actuates the systems required during parking, flight, and landing. The control panel is installed on the right side of the pilots center instrument panel, zone 210.

B. Operation

The landing gear control lever actuates cams which, in turn, actuate switches whenever the lever is moved through its three positions, e.g., DOWN, NEUTRAL and UP. In the down position, the cams actuate eight normally deenergized switches. All switches are in a deenergized position when the lever is in the NEUTRAL position. All switches operate on 28V dc. The lever can be moved freely out of the detent in the UP position through NEUTRAL to the DOWN position. When the lever is in either the NEUTRAL or DOWN position, the lever must be pulled outward approximately one-half inch before it can be moved to any other position. All switches engage in the final 6 degrees of handle travel to either the DOWN or UP position. A solenoid locks the handle in the DOWN position to prevent accidental release of the cams. The override button on the face of the panel releases the solenoid lock on the handle. The solenoid release can also be energized through the proximity switch system (Ref. 33-18-00).

On aircraft 001-031 with SB32-130, a landing gear control switch blocking device permits lever movement to the DOWN and NEUTRAL positions but prevents inadvertent selection of the UP position. Removal of the blocking pin allows landing gear retraction if required, for ditching or aerodynamic clean up in an emergency. The gear switch blocking device may be used in lieu of pinning the gear down for Gear Extended Revenue Flight (GERF) if desired.

EFFECTIVITY: ALL

001B

32-31-00
Page 13
Dec 15/93



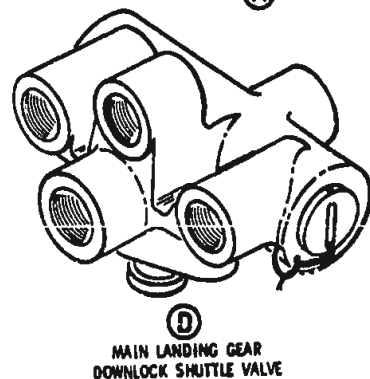
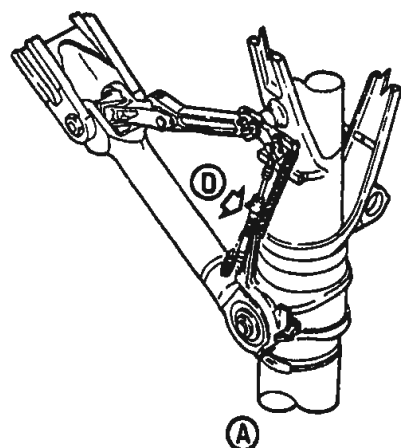
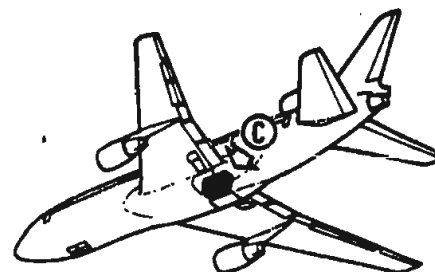
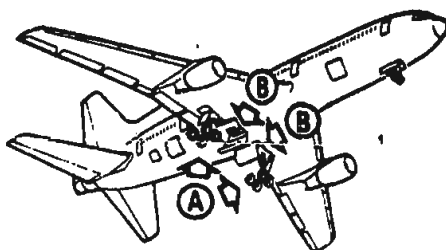
MAINTENANCE MANUAL

R 12. Hydraulic Fuse Module Assembly**A. Description**

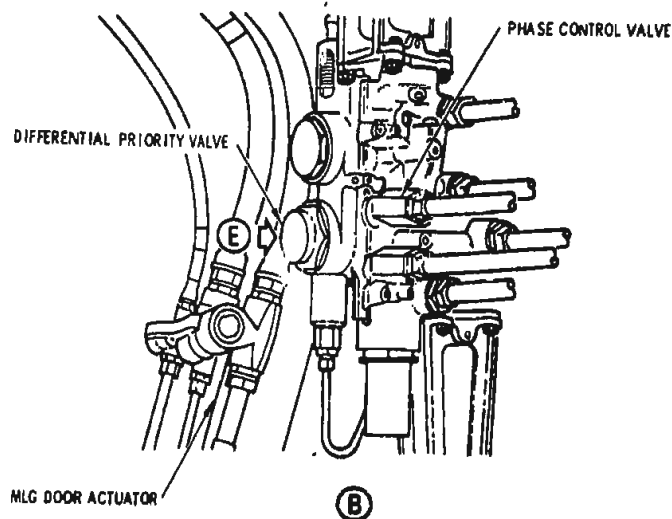
The hydraulic fuse module assembly prevents the loss of system C hydraulic fluid in the event of damage to the hydraulic lines to the truck leveler and/or downlock. One fuse is used for both left and right main landing gear. The module assembly is located on the forward wall of the hydraulic service center, zone 147 (Ref. Fig. 9).

EFFECTIVITY: ALL

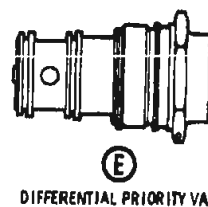
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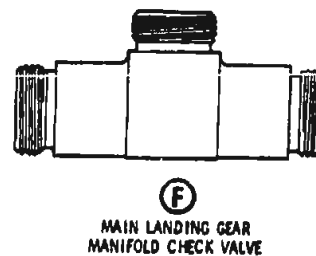
MAIN LANDING GEAR
DOWNLOCK SHUTTLE VALVE



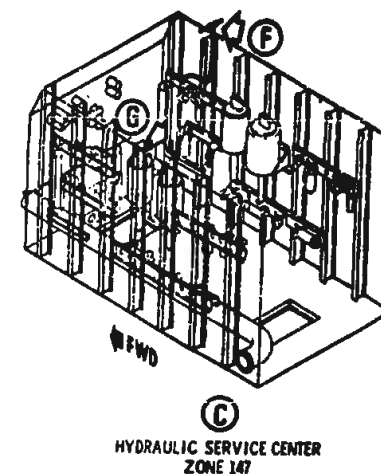
MLG DOOR ACTUATOR



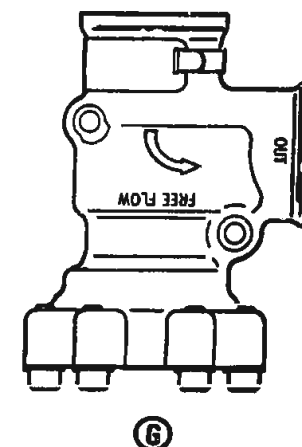
DIFFERENTIAL PRIORITY VALVE



MAIN LANDING GEAR
MANIFOLD CHECK VALVE



HYDRAULIC SERVICE CENTER
ZONE 147



VACUUM CONTROLLED CHECK VALVE

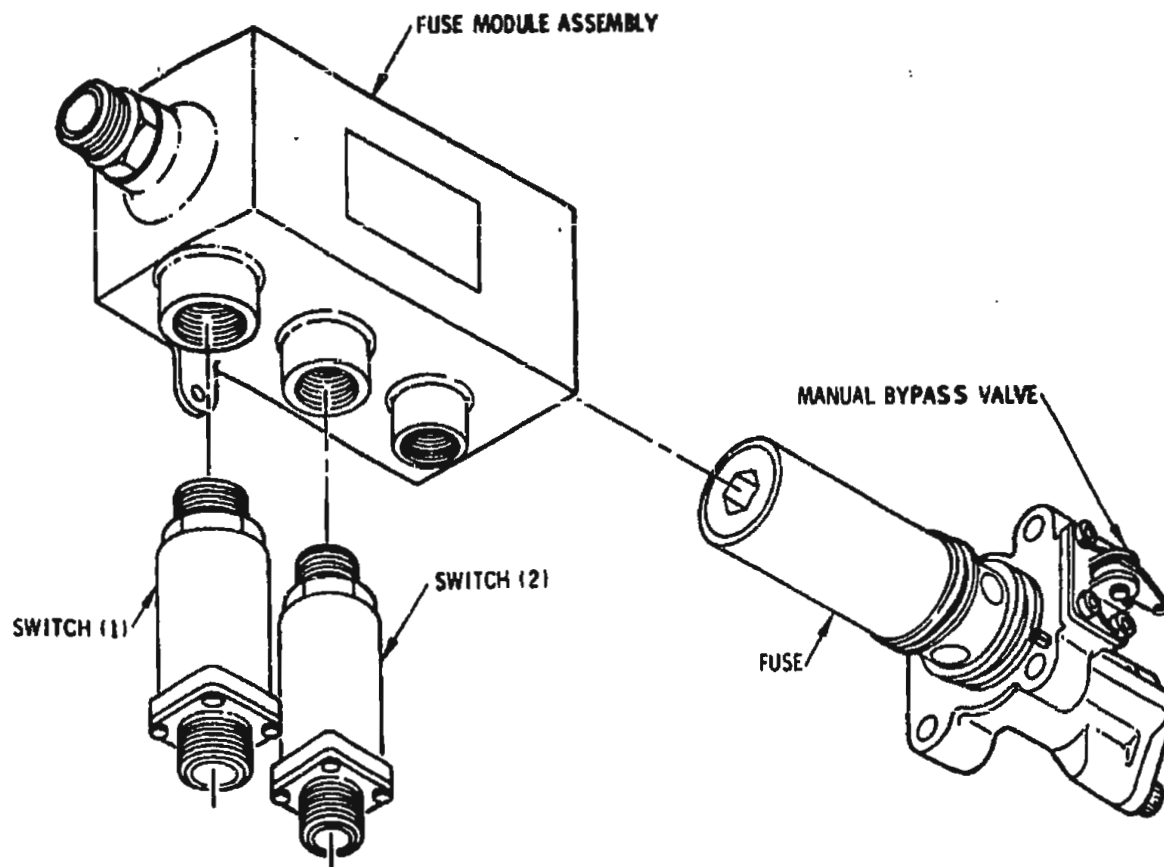
Landing Gear Control Hydraulic Components Locator
Figure 8

M1-0001-32-921

EFFECTIVITY: ALL

32-31-00
Page 15/16
Mar 15/84

LOCKHEED
 MAINTENANCE MANUAL



M1-0000-32-922

Hydraulic Fuse Module Assembly
 Figure 9

R EFFECTIVITY: ALL
 R
 001B

32-31-00
 Page 17/18
 Nov 15/88

LOCKHEED
MAINTENANCE MANUAL

LANDING GEAR CONTROL MODULE ASSEMBLY - REMOVAL AND INSTALLATION

1. Equipment and Materials

Cotter Pin, MS24665-151, or equivalent

Pre-formed packings (Ref. Fig. 401)

Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent

Container (wide lip)

2. Referenced Procedures

- | | |
|----------|--|
| 22-17-00 | APFDS Hydraulic System C Monitor - Adjustment and Test |
| 29-11-00 | Hydraulic Power System - Maintenance Practices |
| 32-30-00 | Landing Gear Retraction and Extension - Adjustment and Test |
| 32-31-02 | Four-way, Three-Position Solenoid Cartridge Valve - Adjustment and Test |
| 32-31-16 | Hydraulic Fuse - Maintenance Practices |
| 32-37-00 | Landing Gear Mechanical Alternate Extension System - Adjustment and Test |

3. Removal/Installation

A. Removal

(1) Turn off hydraulic system C pressure (Ref. 29-11-00).

(2) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breakers GEAR CONT NO. 1 (F17) and NO. 2 (F18), and R AOA (F1).

On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker FCES COMPUTERS AC & L AOA (B5).

(3) Open hydraulic service center access door 147AB.

(4) Open interlock gate.

CR

EFFECTIVITY: ALL

001B

32-31-01
Page 401
Jul 15/83

LOCKHEED
MAINTENANCE MANUAL

- (5) Close the three manual shutoff valves by placing the handles in the up position (Ref. Fig. 401).
- (6) On aircraft 001-031 without SB29-065, disconnect electrical connectors from hydraulic pressure switches and control valve solenoids.
- (6) On aircraft 001-031 with SB29-065 and 032-999, disconnect electrical connectors from control valve solenoids.
- (7) Remove bolt connecting bypass valve to linkage.
- (8) Place container under module to catch spilled hydraulic fluid.
- (9) On aircraft 001-031 without SB29-065, disconnect hydraulic lines from top of module.
- (9) On aircraft 001-031 with SB29-065 and 032-999, disconnect hydraulic lines from top of module and pressure line to hydraulic fuse module.
- (10) Remove bolts securing module to mounting bracket and remove module.
- (11) Remove fittings from module and discard pre-formed packings.

B. Installation

- (1) Ensure that hydraulic system C pressure is turned off (Ref. 29-11-00).
- (2) Verify that circuit breakers opened in Step 3A(2) are open and tagged.
- (3) Reinstall fittings removed in Step 3A(11) with new pre-formed packings (Ref. Fig. 401).
- (4) Position module on mounting bracket and secure in place with bolts and washers.
- (5) Reconnect hydraulic lines removed in Step 3A(9).
- (6) Connect linkage to bypass valve with bolt, washer, and nut. Safety with cotter pin.
- (7) Reconnect electrical connectors removed in Step 3A(6). Safety with lock-wire as required.

R EFFECTIVITY: ALL
R
0018

32-31-01
Page 402
Aug 15/82



MAINTENANCE MANUAL

- (8) Open the three manual shutoff valves by placing the handles in the horizontal position and close the interlock gate.
- (9) Remove tags and close circuit breakers opened in Step 3A(2).

NOTE: On aircraft 001-031 with SB29-065 and 032-999, ensure that hydraulic fuse module fuse indicator has not popped (Ref. Fig. 403 and Ref. 32-31-16).

- (10) Perform landing gear retraction and extension operational test (door swing) (Ref. 32-30-00).
- (11) Perform landing gear mechanical alternate extension system Operational Test (Ref. 32-37-00).

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NOTE: Two Operational Tests of the landing gear mechanical alternate extension system are provided in Ref. 32-37-00. Use Paragraph 6A if the aircraft is on its landing gear or Paragraph 6B if the aircraft is on jacks.

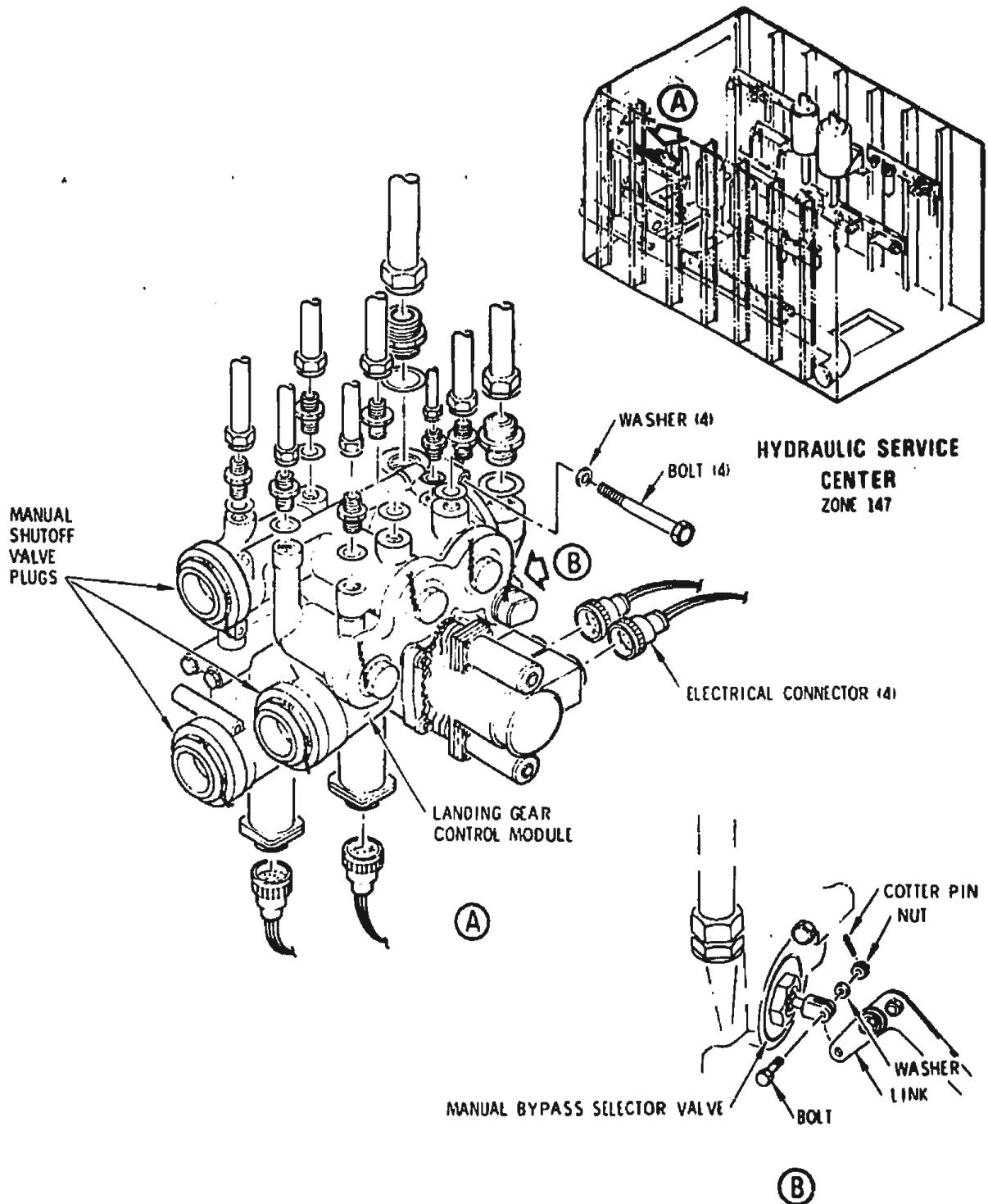
- (12) Perform Four-way, three position solenoid cartridge valve check (Ref. 32-31-02).
- (13) On aircraft 001-031 without SB29-065, perform APFDS hydraulic system C monitor test (Ref. 22-17-00).
- (13) On aircraft 001-031 with SB29-065 and 032-999, this step is not required.
- (14) Recheck all connections for security and leaks.
- (15) Close hydraulic service center access door 147AB.

EFFECTIVITY: ALL

32-31-01
Page 403
Dec 15/92

001B

LOCKHEED
MAINTENANCE MANUAL



M1-0000-32-2929

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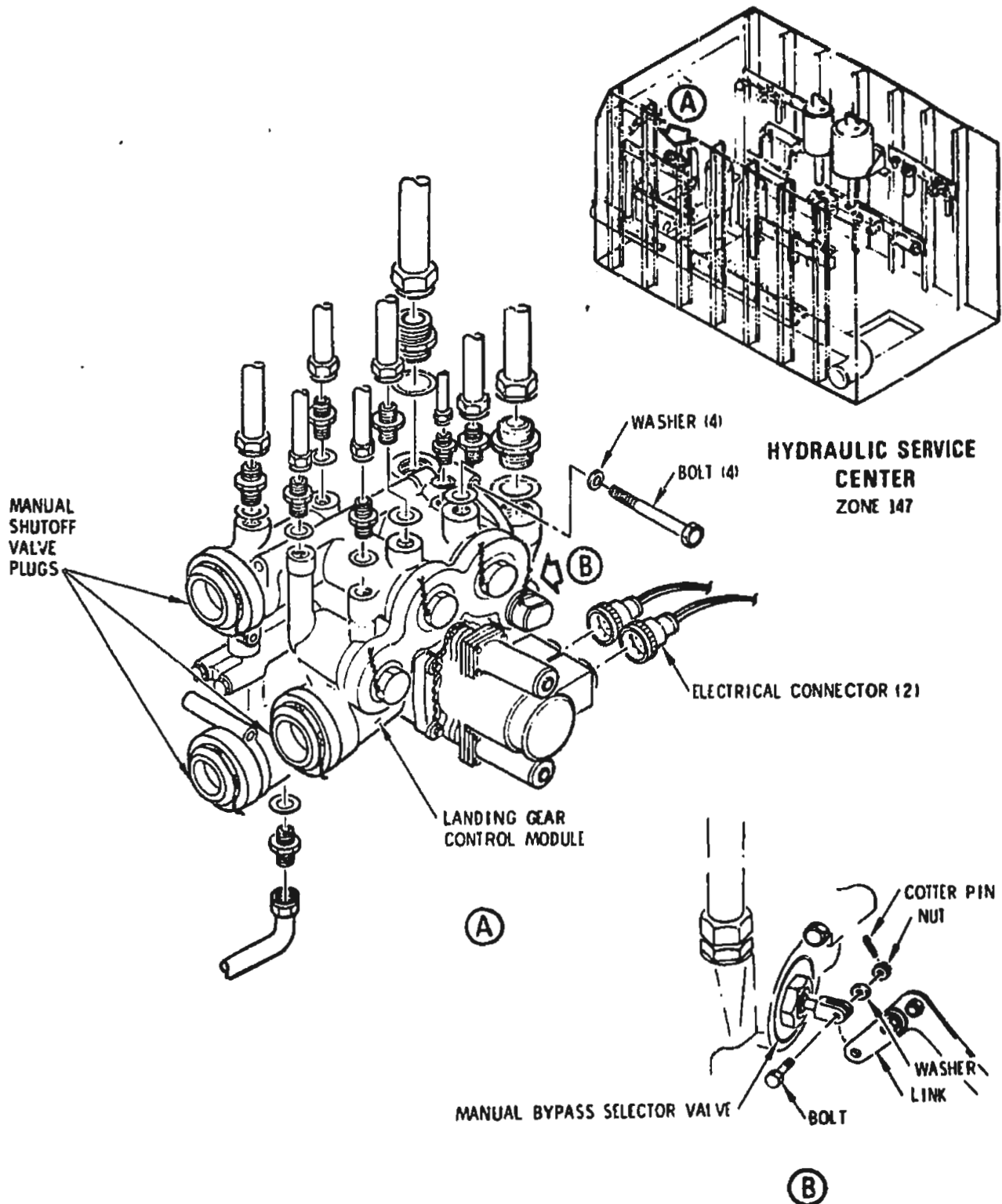
Landing Gear Control Module Assembly - Removal and Installation
Figure 401

EFFECTIVITY: 001-031 WITHOUT SB29-065

32-31-01
Page 404
Jul 15/83

001B

LOCKHEED
MAINTENANCE MANUAL



M1-0000-32-2930

CR Landing Gear Control Module Assembly - Removal and Installation
CR Figure 401

EFFECTIVITY: 001-031 WITH SB29-065 AND 032-999

32-31-01
Page 405
Jul 15/83

001B

LOCKHEED



MAINTENANCE MANUAL

FIGURE DELETED

M1-000-SP-FGD

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Manual Shutoff Cartridge Valve Mechanical Interlock Assembly
Figure 402

0018

EFFECTIVITY: ALL

32-31-01
Page 406
Jul 15/83

LOCKHEED
MAINTENANCE MANUAL

FIGURE DELETED

MI-000-SP-FGD

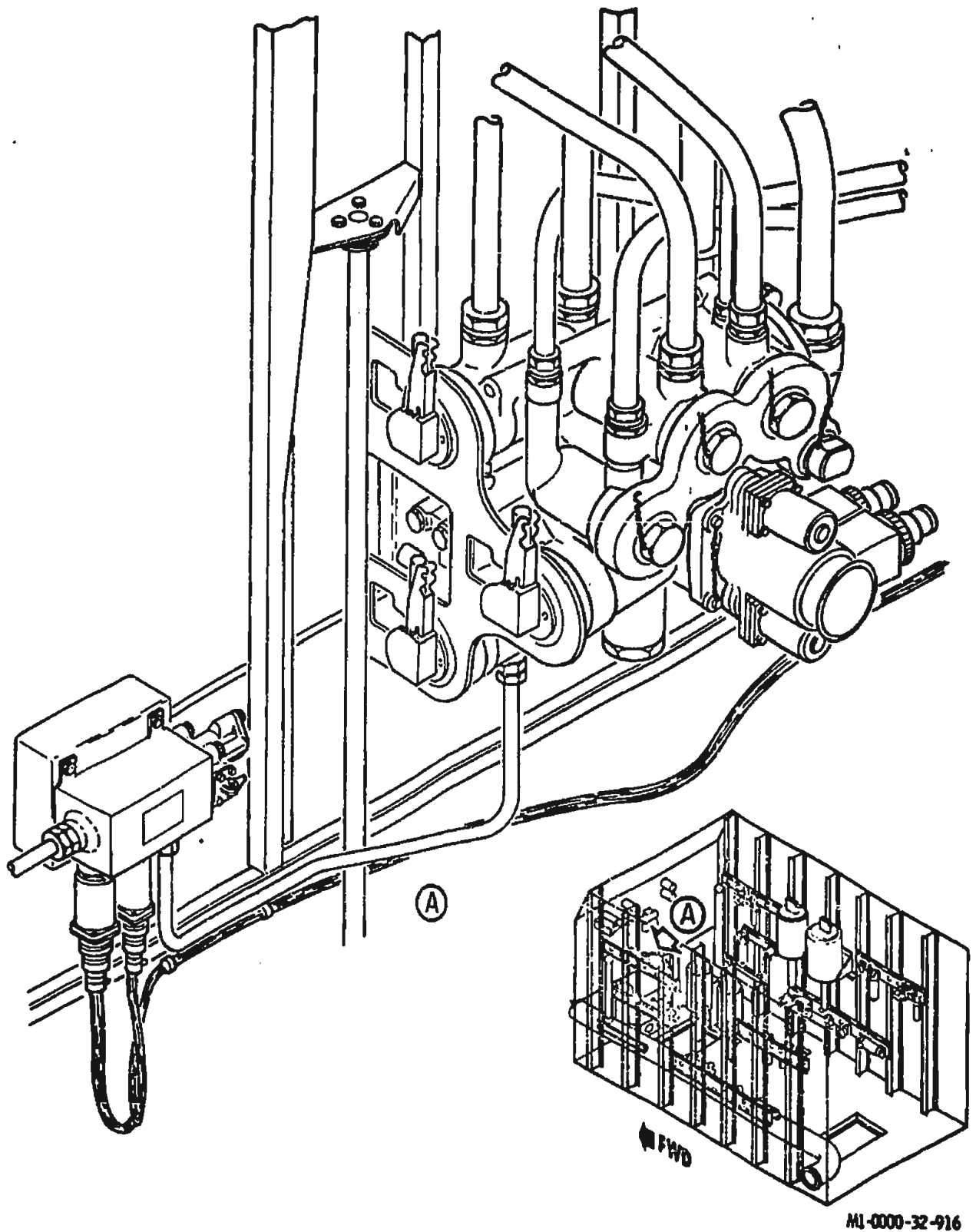
CR Manual Shutoff Cartridge Valve Mechanical Interlock Assembly
CR Figure 402

EFFECTIVITY: ALL

001B

32-31-01
Page 407
Jul 15/83

LOCKHEED
MAINTENANCE MANUAL



Landing Gear Hydraulic Fuse Module Assembly
Figure 403

R EFFECTIVITY: 001-031 WITH SB29-065 AND 032-999
R
001B

32-31-01
Page 408
Jun 15/80

LOCKHEED



MAINTENANCE MANUAL

FOUR-WAY, THREE-POSITION SOLENOID CARTRIDGE VALVE
MAINTENANCE PRACTICES

R 1. Referenced Procedures

R 32-30-00 Landing Gear Retraction and Extension - Maintenance
R Practices

R 2. Deactivation

R A. The four way, three-position solenoid cartridge valve may be
R deactivated by performing the procedures contained in
R Landing Gear Retraction and Extension - Maintenance
R Practices (Ref. 32-30-00).

R 3. Hydraulic System C Check

R A. Procedures to verify hydraulic system C pressure are
R contained in Landing Gear Retraction and Extension -
R Maintenance Practices (Ref. 32-30-00).

R EFFECTIVITY: ALL

0018

32-31-02
Page 201/202
May 15/82

LOCKHEED
MAINTENANCE MANUAL

FOUR-WAY, THREE-POSITION SOLENOID CARTRIDGE VALVE
REMOVAL AND INSTALLATION

1. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, Temp A, 0.050-inch diameter, or equivalent

Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent

Container, 1-quart capacity (wide lip)

Hydraulic Fluid, LAC Spec C-34-1224, Type III, or equivalent

R Landing Gear Lever Blocking Pin

2. Referenced Procedures

29-11-00 Hydraulic Power System - Maintenance Practices

C 32-30-00 32-30-00 Landing Gear Retraction and Extension -
C Operational Test (Door Swing)

3. Removal/Installation

A. Removal

(1) Turn off hydraulic system C pressure (Ref. 29-11-00).

(2) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breakers GEAR CONT NO. 1 (F17) and NO. 2 (F18).

R (3) On aircraft 032, 033,
R install landing gear lever blocking pin.

R (4) Disconnect electrical connectors from valve (Ref. Fig.
R 401).

R (5) Position container under valve to catch spilled
R hydraulic fluid.

R (6) Remove bolts and washers securing valve to landing gear
R control module.

R (7) Pull valve out of module.

B. Installation

EFFECTIVITY: ALL

001B

32-31-02
Page 401
May 15/82

LOCKHEED
MAINTENANCE MANUAL

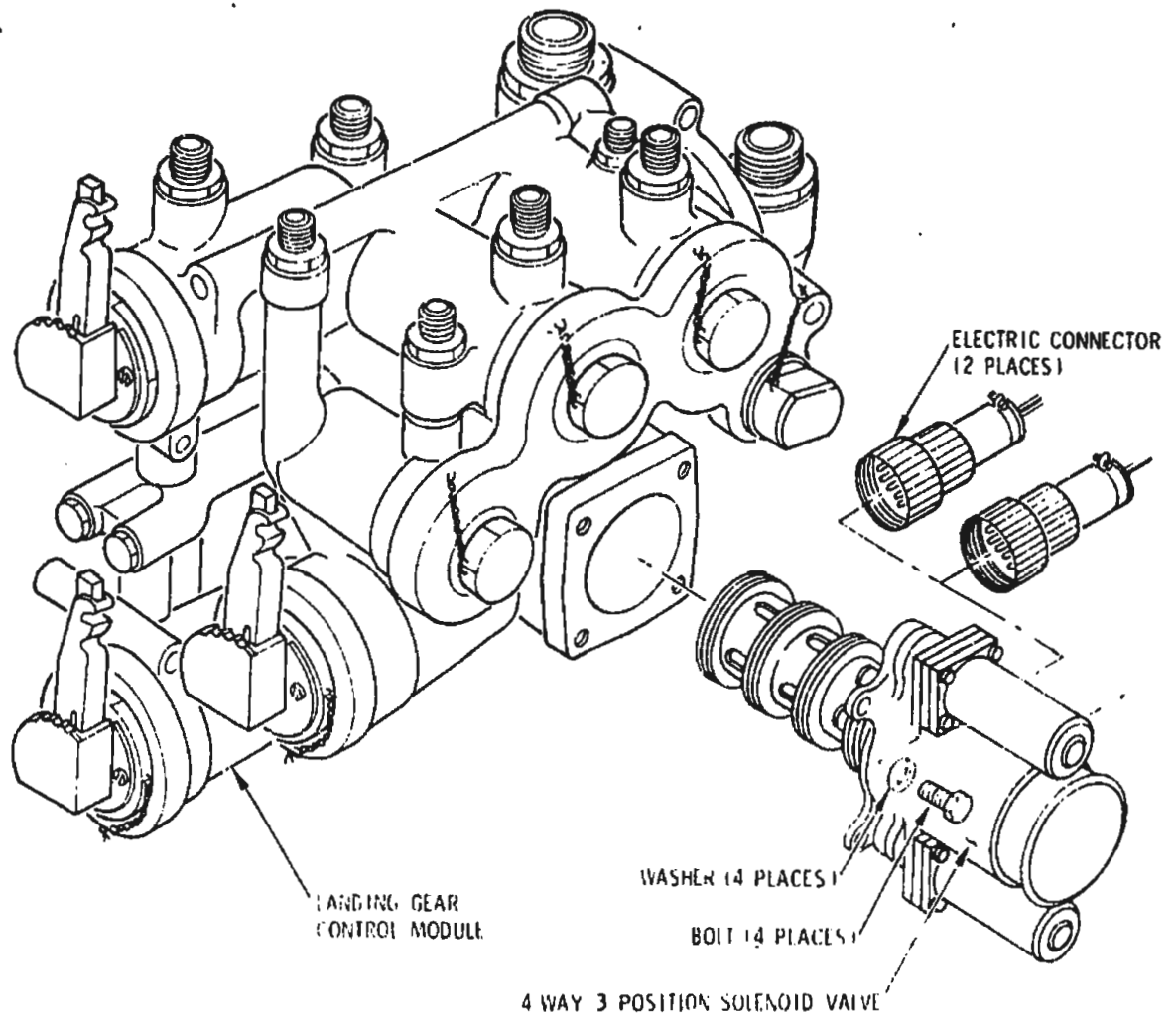
- (1) Ensure that hydraulic system C pressure is turned off (Ref. 29-11-00).
- (2) Verify that circuit breaker opened in Step 3A(2) are open and tagged.
- (3) Inspect seals and packing for wear or damage. Replace as required.
- (4) Lubricate seals, packing, and module bore with hydraulic fluid.
- (5) Position valve in module bore, using care to ensure that seals and packing are not damaged.
- (6) Secure valve to module with bolts and washers.
- (7) Safety bolts with lock-wire (0.050-inch diameter).
- (8) Connect electrical connector to valve, safety with lock-wire (0.020-inch diameter).
- R (9) On aircraft 032, 033,
R remove landing gear lever blocking pin.
- R (10) On Flight Engineer/Second Officers overhead circuit
R breaker panel CB2, close circuit breaker GEAR CONT NO.
R 1 (F17).
- R (11) Perform landing gear retraction and extension
R operational test (Ref. 32-30-00, Door Swing).
- R (12) Open circuit breaker GEAR CONT NO. 1 (F17) and close
R GEAR CONT NO. 2 (F18).
- R (13) Repeat Step (11).
- R (14) Close GEAR CONT NO. 1 (F-17).

EFFECTIVITY: ALL

0018

32-31-02
Page 402
May 15/82

LOCKHEED
MAINTENANCE MANUAL



HA 0138
A11-0100-32-230

Four-way, Three-position Solenoid Cartridge Valve
Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-31-02
Page 403/404
Apr 1/72



FOUR-WAY, THREE-POSITION SOLENOID CARTRIDGE VALVE
ADJUSTMENT AND TEST

1. General

The four-way three-position solenoid cartridge valve has two independent dual-redundant solenoids for each of the "down" and "up" functions. Therefore, one "down" solenoid can be inoperative without any fault indication until the second "down" solenoid fails resulting in the loss of hydraulic system "C" pressure.

This test procedure provides an operational check of both the "gear up" and "gear down" pressures through the solenoid cartridge valve which gives a positive check of all four solenoids and both solenoid pins.

CR 2. Referenced Procedures

- 24-00-00 Electrical Power System - Maintenance Practices
- 29-11-00 Hydraulic Power Systems - Maintenance Practices
- 32-10-00 Landing Gear Inboard Door - Maintenance Practices

CR 3. Four-Way, Three-Position Solenoid Cartridge Valve Test

A. Test

- (1) Ensure that NLG and MLG downlock safety pins are installed, the red streamers are wrapped around the jury braces and downlock safety pins, and turns of lock-wire are used to secure streamers and pins in place so there is no possibility of the downlock safety pins being inadvertently removed.

- C (2) (Deleted)



MAINTENANCE MANUAL

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- R
- (3) Turn on hydraulic system C pressure (Ref. 29-11-00).
 - (4) Turn on electrical power (Ref. 24-00-00).
 - (5) Ensure that MLG inboard doors are closed (Ref. 32-10-00).
 - (6) Ensure that MLG door area is clear of personnel and equipment.
 - (7) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, open circuit breaker GEAR CONT NO. 1 (F17), and verify circuit breaker GEAR CONT NO. 2 (F18) closed.
 - (8) On pilots center instrument panel, place LANDING GEAR CONTROL lever to UP position. MLG doors should open.
 - (9) Place lever to DOWN position. MLG doors should close.
 - (10) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, close circuit breakers GEAR CONT NO. 1 (F17) and open circuit breaker GEAR CONT NO. 2 (F18).
 - (11) On pilots center instrument panel, place LANDING GEAR CONTROL lever to UP position. MLG doors should open.
 - (12) Place lever to DOWN position. MLG doors should close.
 - (13) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, close circuit breaker GEAR CONTS NO. 2 (F18).
- R
- (14) Turn off hydraulic power as required (Ref. 29-11-00).
 - (15) Turn off electrical power as required (Ref. 24-00-00).
- C
- (16) (Deleted)

EFFECTIVITY: ALL

LOCKHEED



MAINTENANCE MANUAL

CR 5. (Deleted)

EFFECTIVITY: ALL

001B

32-31-02
Page 503/504
Nov 15/84

LOCKHEED
MAINTENANCE MANUAL

HYDRAULIC FLOW REGULATOR CARTRIDGE VALVE (23 GPM)
REMOVAL AND INSTALLATION

1. Equipment and Materials:

Lock-wire, Fed Spec QQ-W-390, Temp 0.050-inch diameter, or equivalent

Container, 2-quart capacity (wide lip)

Hydraulic Fluid, LAC Spec C-34-1224, Type III, or equivalent

2. Referenced Procedure

29-11-00 Hydraulic Power System - Maintenance Practices

4. Removal/Installation

A. Removal

- (1) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (2) Position container under cartridge to catch spilled fluid.
- (3) Using a wrench, loosen cartridge (Ref. Fig. 401).
- (4) Unscrew cartridge out of module.

B. Installation

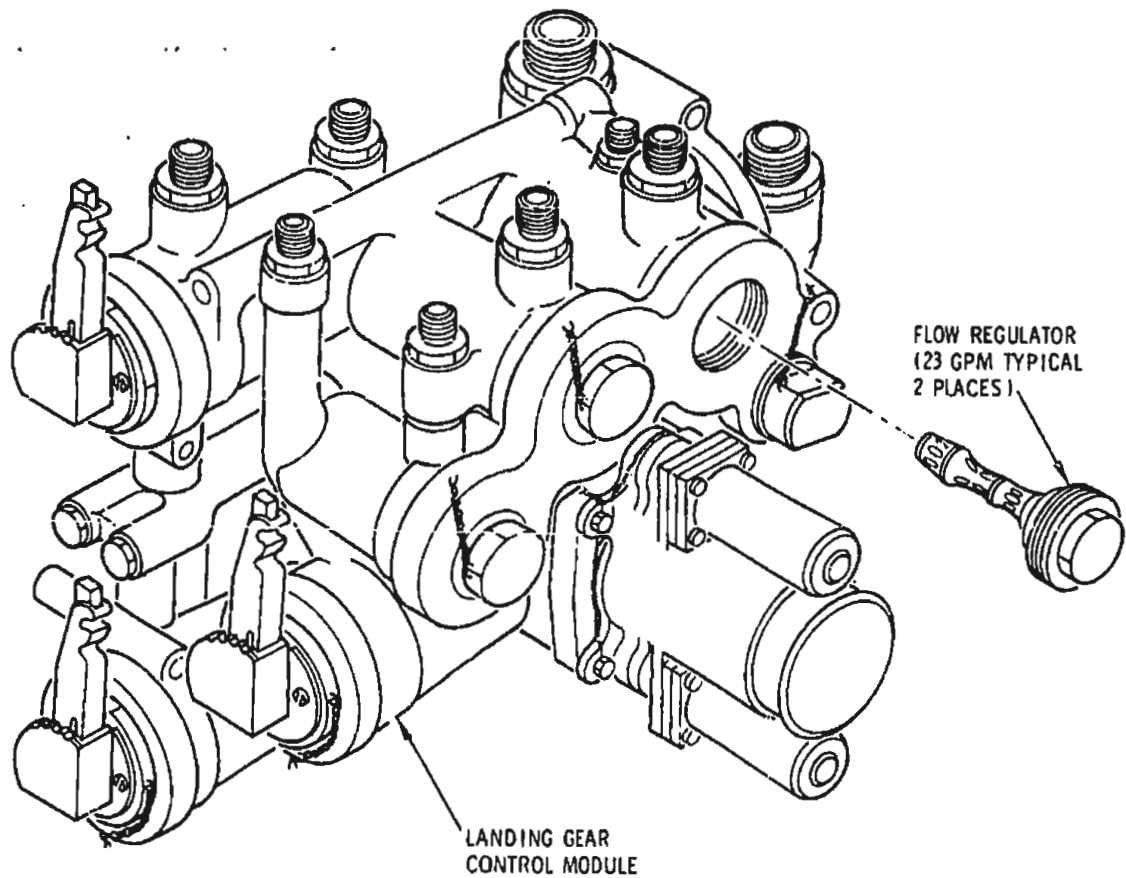
- (1) Ensure that hydraulic system C pressure is turned off (Ref. 29-11-00).
- (2) Inspect seals and packing for wear or damage.
- (3) Lubricate seals, packing, and module bore with hydraulic fluid.
- (4) Position cartridge in module bore, using care to ensure that seals and packing are not damaged.
- (5) Screw cartridge in and torque 80 (± 10) lb in.
- (6) Safety with lock-wire.

EFFECTIVITY: ALL

001B

32-31-04
Page 401
Jul 15/73

LOCKHEED
MAINTENANCE MANUAL



HA 0114
M1-0100-32-237

Hydraulic Flow Regulator Cartridge Valve (23 GPM)
Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-31-04
Page 402
Jul 15/73

001B



TWO-WAY HYDRAULIC FLOW REGULATOR CARTRIDGE VALVE (5 GPM)
REMOVAL AND INSTALLATION

1. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, Temp A, 0.050-inch diameter, or equivalent

Container, 2-quart capacity (wide lip)

Hydraulic Fluid, LAC Spec C-34-1224, Type III, or equivalent

2. Referenced Procedure

29-11-00 Hydraulic Power System - Maintenance Practices

3. Removal/Installation

A. Removal

- (1) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (2) Position container under cartridge to catch spilled fluid.
- (3) Using a wrench, loosen cartridge (Ref. Fig. 401).
- (4) Unscrew cartridge out of module.

B. Installation

- (1) Ensure that hydraulic system C pressure is turned off (Ref. 29-11-00).
- (2) Inspect seals and packing for wear or damage.
- (3) Lubricate seals, packing, and module bore with hydraulic fluid.
- (4) Position cartridge in module bore, using care to ensure that seals and packing are not damaged.
- (5) Screw cartridge in and torque 80 (± 10) lb in.
- (6) Safety with lock-wire.

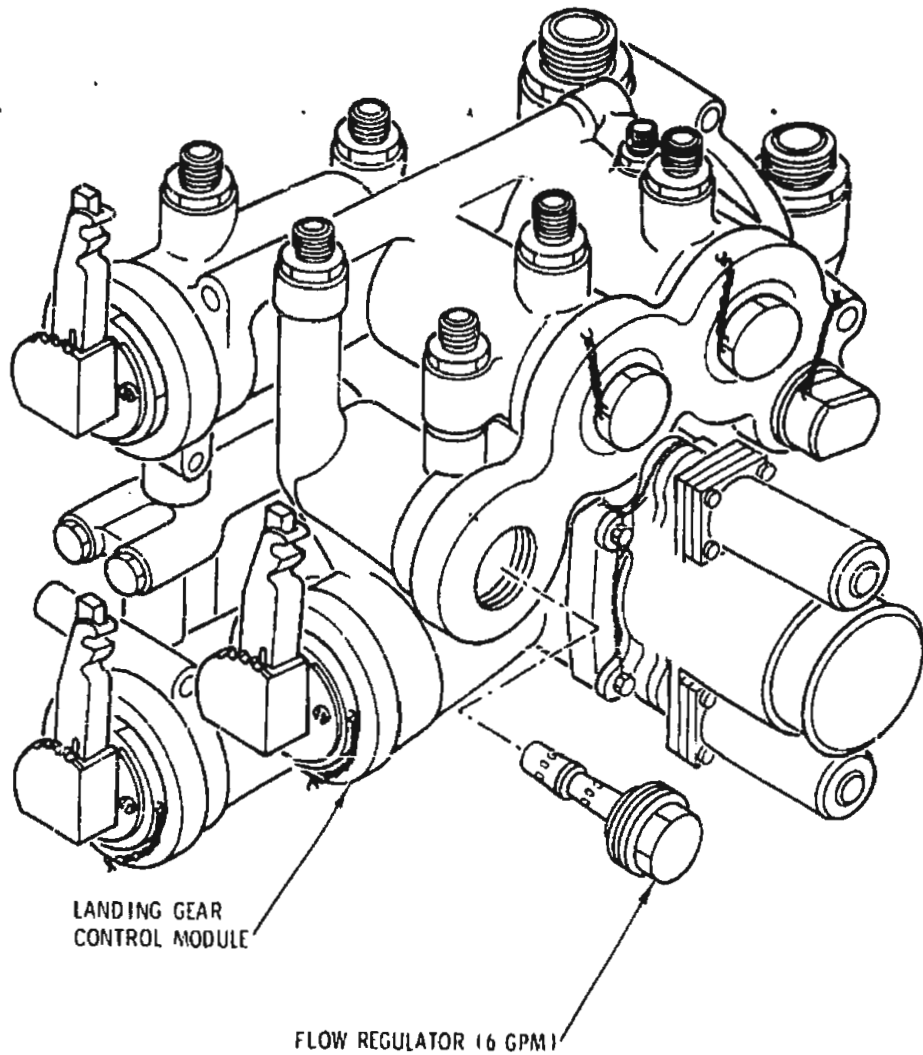
EFFECTIVITY: ALL

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32-31-05

Page 401
Jul 15/73

LOCKHEED
MAINTENANCE MANUAL



11A-0117
M1-0100-32-238

**Two-way Hydraulic Flow Regulator Cartridge Valve (6 GPM)
Removal and Installation
Figure 401**

EFFECTIVITY: ALL

32-31-05
Page 402
Jul 15/73

LOCKHEED
MAINTENANCE MANUAL

MANUALLY OPERATED BYPASS SELECTOR CARTRIDGE VALVE
REMOVAL AND INSTALLATION

1. Equipment and Materials

Lock-wire, QQ-W-390, Temp A, 0.040-inch diameter, or equivalent
Cotter Pin, MS24665-151, or equivalent
Hydraulic Fluid, LAC Spec C-34-1224, Type III, or equivalent
Container (wide lip), 1-quart capacity

2. Referenced Procedures

29-11-00 Hydraulic Power System - Maintenance Practices

R 32-30-00 Landing Gear Retraction and Extension - Adjustment
R and Test

3. Removal/Installation

A. Removal

- (1) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (2) Remove bolt connecting valve to control linkage (Ref. Fig. 401).
- (3) Place container under module to catch spilled fluid.
- (4) Using a wrench, loosen cartridge.
- (5) Unscrew cartridge and remove from module.

B. Installation

- (1) Ensure that hydraulic system C pressure is turned off (Ref. 29-11-00).
- (2) Inspect cartridge seals and packing for wear and damage. Replace as required.
- (3) Lubricate seals, packing, and module bore with hydraulic fluid.
- (4) Install cartridge in module bore. Torque to 80 (± 10) lb in.

EFFECTIVITY: ALL

0508

32-31-06
Page 401
Oct 1/72

LOCKHEED



MAINTENANCE MANUAL

- (5) Safety with lock-wire.
- (6) Connect valve to control linkage with bolt, washers, and nut. Safety with cotter pin.
- (7) Perform landing gear extension using mechanical alternate extension system (Ref. 32-37-00).

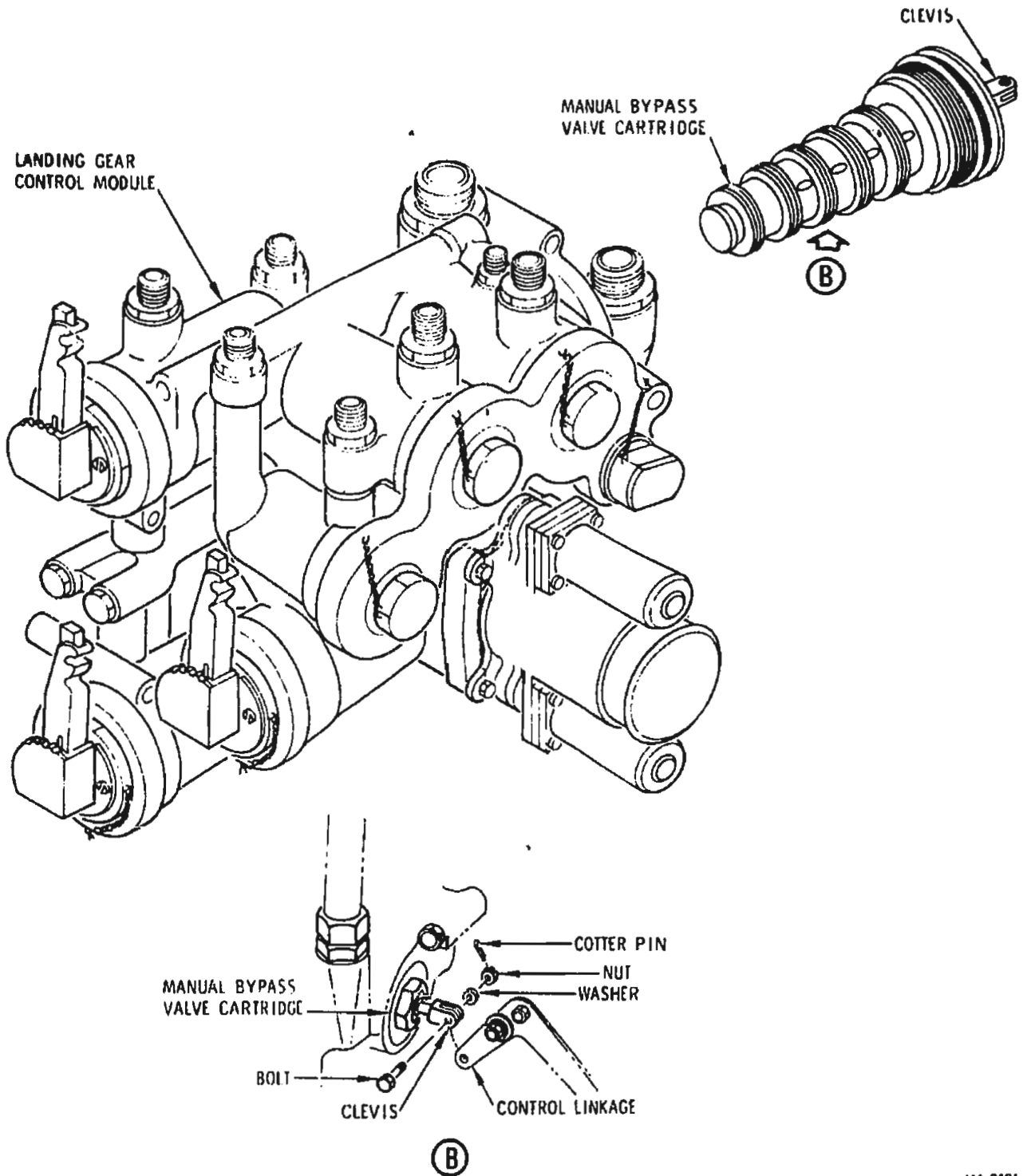
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EFFECTIVITY: ALL

001B

32-31-06
Page 402
May 15/85

LOCKHEED
MAINTENANCE MANUAL



HA 0191
M1-0100-32-252

**Manually Operated Bypass Selector Cartridge Valve
Removal and Installation
Figure 401**

EFFECTIVITY: ALL

32-31-06
Page 403/404
Apr 1/72

DIFFERENTIAL PRIORITY CARTRIDGE VALVE - REMOVAL AND INSTALLATION1. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, Temp A, 0.032-inch diameter, or equivalent

Hydraulic Fluid, LAC Spec C-34-1224, Type III, or equivalent

Container (wide lip) 1-quart capacity

R Trichloroethylene, Fed Spec O-T-634, or equivalent

2. Referenced Procedures

29-11-00 Hydraulic Power System - Maintenance Practices

32-10-00 Main Landing Gear Inboard Door - Maintenance Practices

3. Removal/InstallationA. Removal

(1) Open applicable MLG inboard door and install door actuator lock (Ref. 32-10-00).

(2) Ensure that hydraulic system C pressure is 0 psi (Ref. 29-11-00).

(3) Place container under phase control valve module to catch spilled fluid (Ref. Fig. 401).

R (4) Clean cartridge valve cap and surrounding area with
R lint-free cloth dampened with trichloroethylene.

R (5) Using a wrench, loosen cartridge.

R (6) Unscrew cartridge and remove from phase control valve
R module.

R (7) If valve is not immediately replaced, plug module port
R to prevent contamination.

B. Installation

(1) Ensure that hydraulic system C pressure is turned off.
(Ref. 29-11-00).

EFFECTIVITY: ALL

LOCKHEED



MAINTENANCE MANUAL

- (2) Inspect cartridge seals and packing for wear and damage. Replace as required.
- (3) Lubricate seals, packing, and phase control valve module bore with hydraulic fluid.
- (4) Install cartridge in module bore, torque 80 (± 10) lb in., and lock-wire.

R

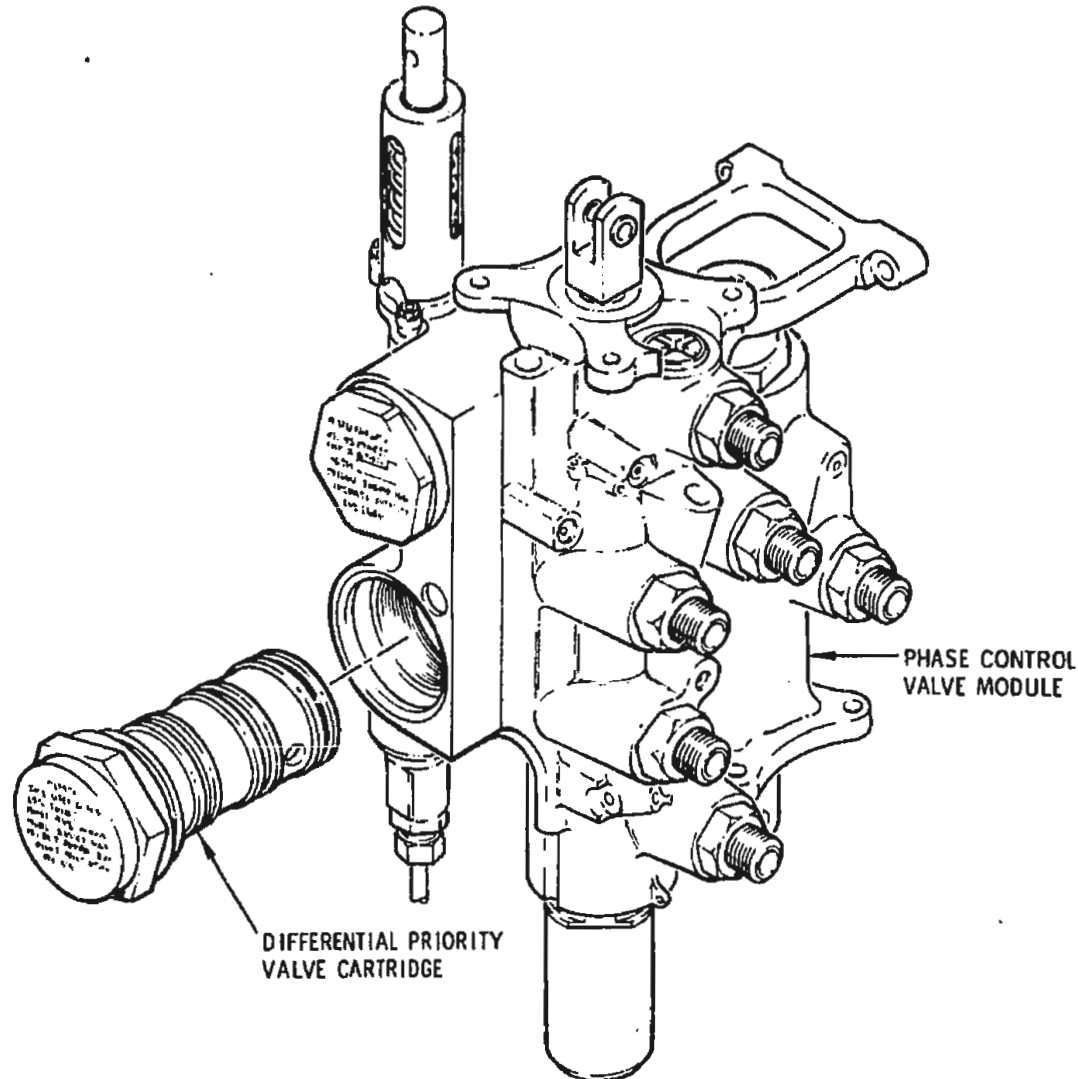
NOTE: Lock-wire cartridge to module body and not to runaround valve.

- (5) Remove MLG door actuator lock and close MLG door (Ref. 32-10-00).

EFFECTIVITY: ALL

001B

32-31-07
Page 402
Nov 15/82



HA 0141
M1-0100-32-244

Differential Priority Cartridge Valve - Removal and Installation
Figure 401

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001B EFFECTIVITY: ALL

32-31-07
Page 403/404
Mar 15/73

LOCKHEED
MAINTENANCE MANUAL

CR MANUAL SHUTOFFVALVE PLUG - REMOVAL AND INSTALLATION

1. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, Temp A, 0.040-inch diameter, or equivalent

Hydraulic Fluid, LAC Spec C-34-1224, Type III, or equivalent

Container (wide lip) 1-quart capacity

2. Referenced Procedures

29-11-00 Hydraulic Power System - Maintenance Practices

32-30-00 Landing Gear Retraction and Extension - Adjustment and Test

3. Removal/Installation

A. Removal

(1) Turn off hydraulic system C pressure (Ref. 29-11-00).

(2) Place container under module to catch spilled fluid.

CR (3) Using a wrench, loosen plug (Ref. Fig. 401).

CR (4) Unscrew plug and remove from module.

B. Installation

(1) Ensure that hydraulic system C pressure is turned off (Ref. 29-11-00).

CR (2) Inspect plug seals and packing for wear and damage. Replace as required.

(3) Lubricate seals, packing, and module bore with hydraulic fluid.

CR (4) Install plug in module bore, torque 80 (± 10) lb in.,
CR and lock-wire.

CR (5) Pressurize system and check for leaks.

EFFECTIVITY: ALL

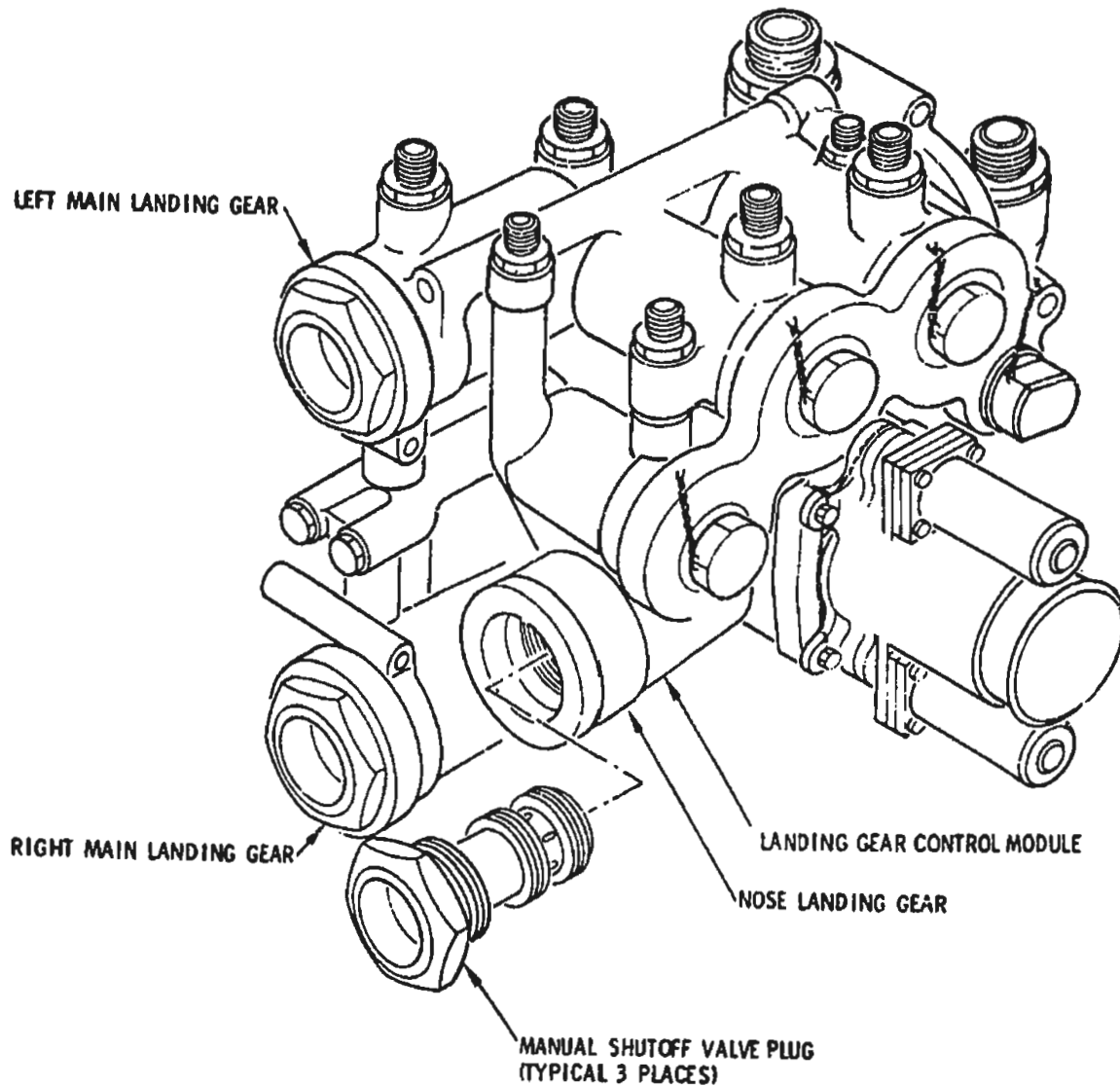
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32-31-08
Page 401
Jul 15/83

LOCKHEED



MAINTENANCE MANUAL



M1-0000-32-2928

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Manual Shutoff Cartridge Valve - Removal and Installation
Figure 401

EFFECTIVITY: ALL.

001B

32-31-08
Page 402
Jul 15/83

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR DOWNLOCK SHUTTLE VALVE
REMOVAL AND INSTALLATION

1. Equipment and Materials

Lock-wire, QQ-W-390, Temp A, 0.032-inch diameter, or equivalent
Hydraulic Fluid, LAC Spec C-34-1224, Type III, or equivalent
Protective caps and plugs
Container, 1-quart capacity

2. Referenced Procedures

29-11-00 Hydraulic Power System - Maintenance Practices
32-10-00 Main Landing Gear Inboard Door - Maintenance
Practices

R

3. Removal/Installation

A. Removal

- (1) Open applicable main landing gear (MLG) inboard door and install inboard door actuator lock (Ref. 32-10-00).
- (2) Ensure that ALTERNATE HYDRAULIC LANDING GEAR EXTENSION switch (aft left side of pilots center console, zone 210) is in the NORMAL (guard down) position and tagged to prevent selection of the alternate extension condition.
- (3) Bleed off any residual hydraulic pressure at downlock actuator bleed valve (Ref. Fig. 401).
- (4) Position container under actuator to catch spilled hydraulic fluid.
- (5) Disconnect hydraulic flex lines at shuttle valve.
- (6) Cap and plug hydraulic lines and valve ports to prevent contamination.
- (7) Remove bolts securing valve to actuator.
- (8) Remove bolts securing manifold to actuator.

EFFECTIVITY: ALL

0188

32-31-10
Page 401
Aug 15/77

LOCKHEED
MAINTENANCE MANUAL

- (9) Remove valve and manifold. Separate valve from manifold.
- (10) Plug ports in actuator, valve, and manifold to prevent contamination.

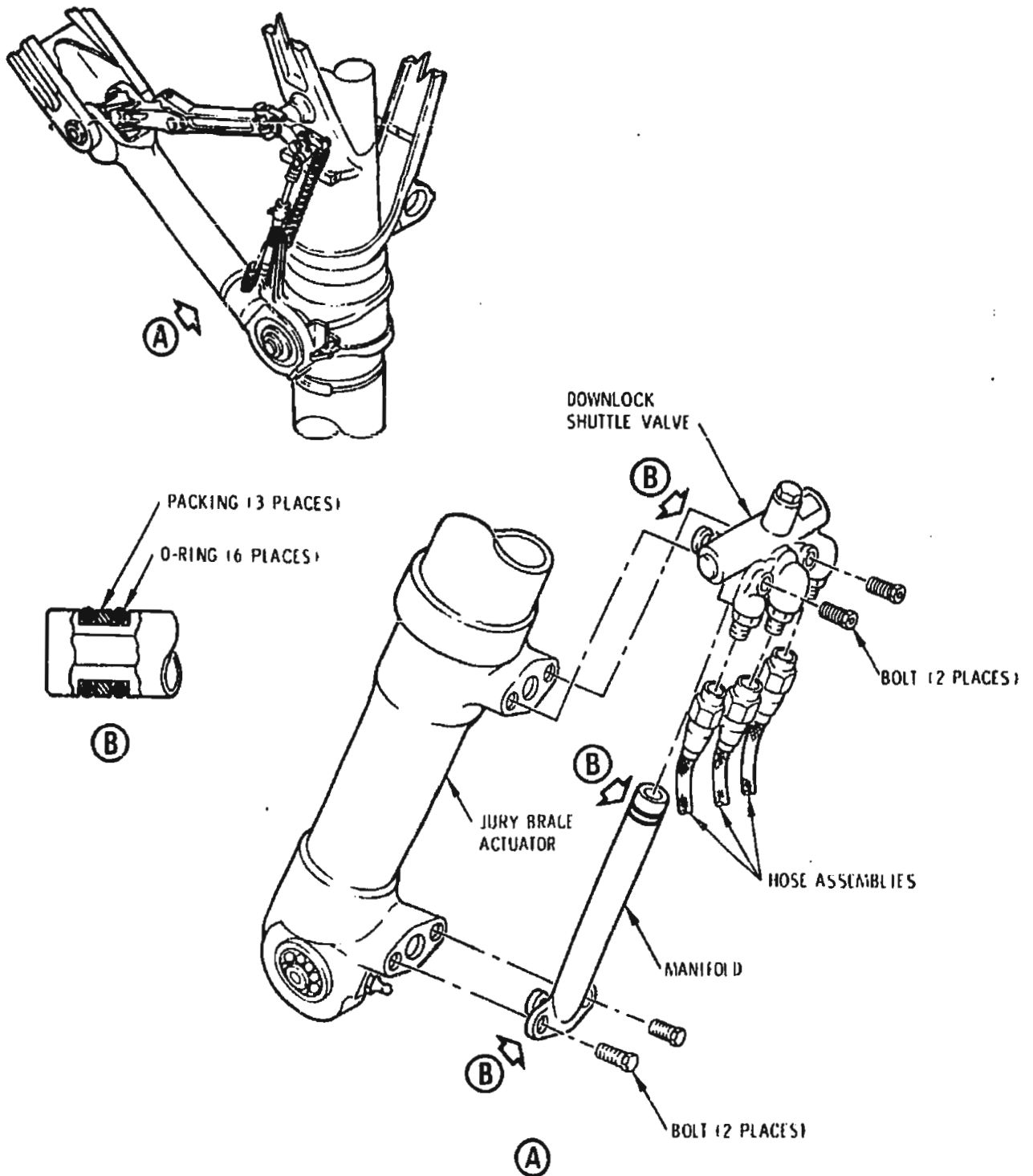
B. Installation

- (1) Ensure that hydraulic system C is turned off.
- (2) Ensure that ALTERNATE HYDRAULIC LANDING GEAR EXTENSION switch (aft left side of pilots center console, zone 210) is in the NORMAL (guard down) position and tagged to prevent selection of the alternate extension condition.
- (3) Inspect shuttle valve and manifold seals for wear and damage. Replace as required.
- (4) Lubricate valve bore and manifold top seal with hydraulic fluid. Assemble valve to manifold.
- (5) Lubricate actuator bores, and valve and manifold seals. Insert valve and manifold into actuator bores.
- (6) Install bolts securing valve and manifold to actuator.
- (7) Safety bolts with lock-wire.
- (8) Connect hydraulic flex lines to valve.
- (9) Turn on hydraulic system C pressure (Ref. 29-11-00).
- (10) Bleed air from actuator at actuator bleed valve.
- (11) Safety bleed valve with lock-wire.
- (12) Remove inboard door actuator lock and close door (Ref. 32-10-00).
- R (13) Remove tag from switch tagged in Step 4A(2).

EFFECTIVITY: ALL

32-31-10
Page 402
Aug 15/77

LOCKHEED
MAINTENANCE MANUAL



**Main Landing Gear Downlock Shuttle Valve
Removal and Installation
Figure 401**

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EFFECTIVITY: ALL

32-31-10
Page 403/404
Apr 1/72

LOCKHEED
MAINTENANCE MANUAL

VACUUM CONTROLLED CHECK VALVE - REMOVAL AND INSTALLATION

1. General

The vacuum-controlled check valve is located in the hydraulic service center, zone 147, right side forward, aft of the alternate brake system accumulator. Mounting is performed by using through-bolts to a bracket.

2. Equipment and Materials

Extended Assembly Time Faying Surface Corrosion Inhibitive Sealing Compound, LAC Spec LCM40-2121, or equivalent

Container, 2-gallon capacity

Protective plugs and caps

3. Referenced Procedures

- R 20-51-04 Environmental Sealing of L-1011 Airplane (PB75-425)
R 29-11-00 Hydraulic Power System - Maintenance Practices

R 4. Removal/Installation

R A. Removal

- R (1) Turn off hydraulic system C pressure (Ref. 29-11-00).
R (2) Position container under valve to catch spilled
R hydraulic fluid.
R (3) Disconnect hydraulic lines at top and side of valve
R (Ref. Fig. 401).
R (4) Remove bolts securing valve to bracket.
R (5) Remove valve.
R (6) Plug hydraulic lines, and cap valve ports to prevent
R contamination.

R B. Installation

- R (1) Ensure that hydraulic system C pressure is turned off
R (Ref. 29-11-00).

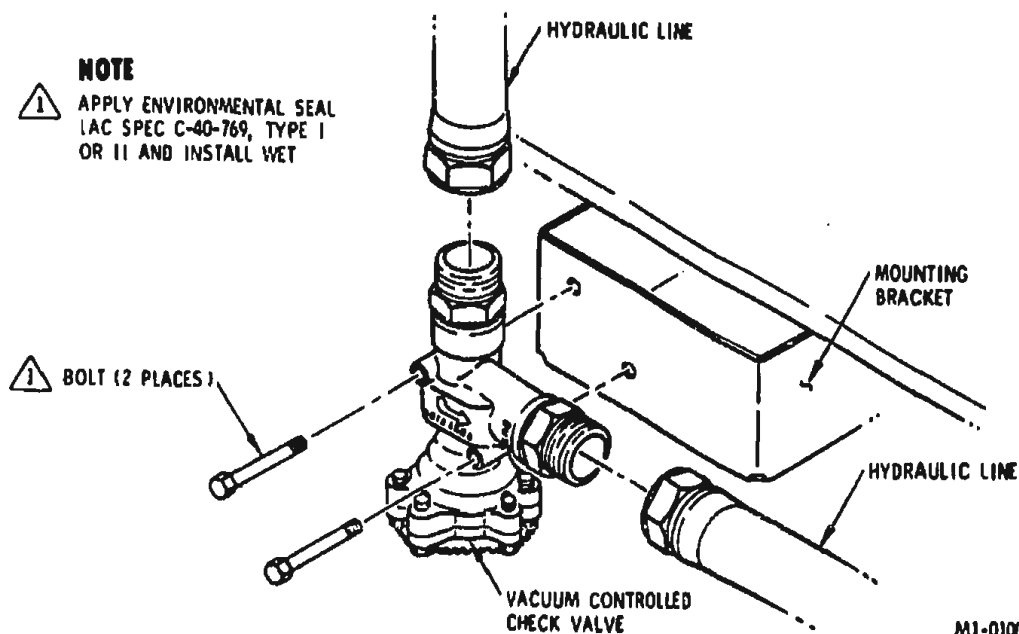
EFFECTIVITY: ALL

001B

32-31-11
Page 401
May 15/85



- R (2) Coat bolt shank and underside of bolt head with
- R extended assembly time faying surface corrosion
- R inhibitive sealing compound (Ref. 20-51-04).
- R (3) Position valve on mounting bracket and install bolts.
- R (4) Remove plugs and connect hydraulic lines.
- R (5) Turn on hydraulic system C pressure (Ref. 29-11-00).
- R (6) Check for hydraulic fluid leaks.
- R (7) Turn off hydraulic system C pressure (Ref. 29-11-00).



Vacuum-controlled Check Valve - Removal and Installation
 Figure 401

EFFECTIVITY: ALL

LOCKHEED



MAINTENANCE MANUAL

LANDING GEAR CONTROL SWITCH
MAINTENANCE PRACTICES

R 1. Referenced Procedures

R 32-30-00 Landing Gear Retraction and Extension - Maintenance
R Practices

R 2. Deactivation

R A. The control switch may be deactivated by performing the
R procedures contained in Landing Gear Retraction and
R Extension - Maintenance Practices (Ref. 32-30-00).

R 3. Hydraulic System C Check

R A. Procedures to verify hydraulic system C pressure are
R contained in Landing Gear Retraction and Extension -
R Maintenance Practices (Ref. 32-30-00).

R EFFECTIVITY: ALL
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0018

32-31-14
Page 201/202
May 15/82

LOCKHEED
MAINTENANCE MANUAL

LANDING GEAR CONTROL SWITCH - REMOVAL AND INSTALLATION

C 1. Referenced Procedures

- 24-00-00 Electrical Power System - Maintenance Practices
- 29-11-00 Hydraulic Power System - Maintenance Practices
- 32-33-00 Landing Gear Inboard Door - Maintenance Practices

C 2. Removal/Installation

A. Removal

- (1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker LANDING GEAR DOOR POSN IND (L13).

On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breakers TAIL SKID CONT (F12), GEAR CONT NO. 1 (F17), GEAR CONT NO. 2 (F18), GEAR TRUCK LEVEL (F16), PARKING BRAKE NO. 1 (G18), PARKING BRA-AYKE NO. 2 (G22), and BRAKE ANTISKID (F22).

- R (2) Loosen fasteners on face of control switch (Ref. Fig. 401).
- (3) Pull out control switch assembly.
- (4) Disconnect electrical connector on back of control switch assembly.

B. Installation

- (1) Verify that circuit breakers opened in Step 3A(1) are open and tagged.
- (2) Install electrical connector on back of control switch assembly.
- R (3) Position control switch assembly in instrument panel and secure fasteners.
- (4) Remove tags and close circuit breakers opened in Step 2A(1).
- (5) Perform landing gear control operating test as follows:

EFFECTIVITY: ALL

32-31-14
Page 401
Jun 15/92



MAINTENANCE MANUAL

- (a) Ensure that NLG and MLG downlock safety pins are installed, the red streamers are wrapped around the jury braces and downlock safety pins, and turns of lock-wire are used to secure streamers and pins in place so there is no possibility of the downlock safety pins being inadvertently removed.

C

- (b) Deleted

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (c) Turn on hydraulic system C pressure (Ref. 29-11-00).
- (d) Turn on electrical power (Ref. 24-00-00).
- (e) Ensure that MLG inboard doors are closed (Ref. 32-33-00).
- (f) Ensure that MLG door area is clear of personnel and equipment.
- (g) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, open circuit breaker GEAR CONT NO. 1 (F17).
- (h) On pilots center instrument panel depress landing gear override button and place LANDING GEAR CONTROL lever to UP position. Doors should open.

C
C

NOTE: NLG and MLG green lights may extinguish with control lever in UP position.

- (i) Place lever to DOWN position. Doors should close.
- (j) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, close circuit breakers GEAR CONT NO. 1 (F17) and open circuit breaker GEAR CONT NO. 2 (F18).

LOCKHEED



MAINTENANCE MANUAL

- C (k) On pilots center instrument panel, depress landing
C gear override button and place LANDING GEAR
C CONTROL lever to UP position. Doors should open.

C NOTE: NLG and MLG green lights may extinguish with
C control lever in UP position.

- (l) Place lever to DOWN position. Doors should close.

- (m) On Flight Engineer/Second Officers overhead
circuit breaker panel CB2, close circuit breaker
GEAR CONTS NO. 2 (F18).

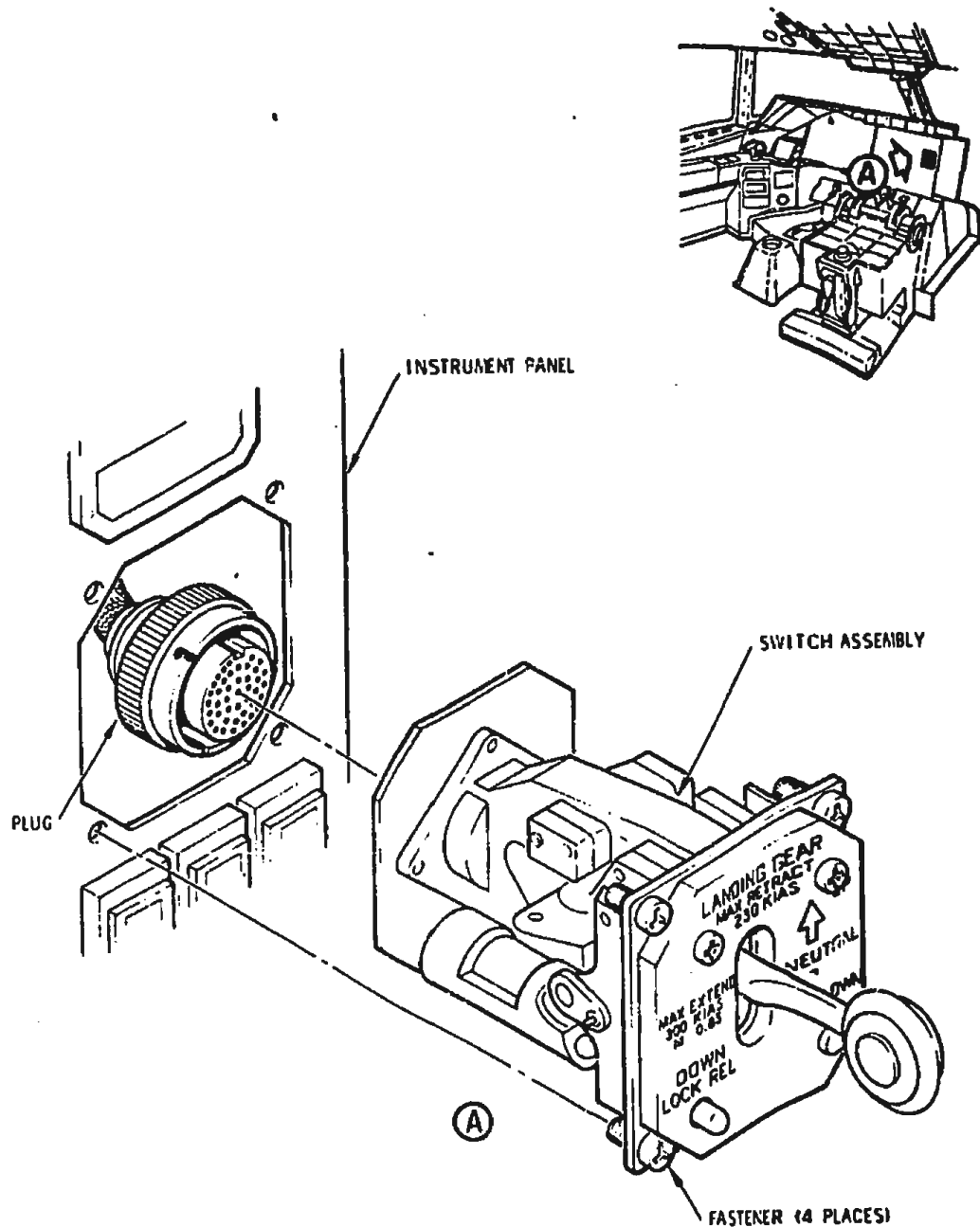
- (n) Turn off hydraulic power as required (Ref.
29-11-00).

- C (o) Turn off electrical power as required (Ref.
24-00-00).

R EFFECTIVITY: ALL
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001B

32-31-14
Page 403
Jun 15/92

LOCKHEED
MAINTENANCE MANUAL



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Landing Gear Control Switch - Removal and Installation
Figure 401

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001B

EFFECTIVITY: ALL

32-31-14
Page 404
Jun 15/92

HYDRAULIC PRESSURE SWITCH - REMOVAL AND INSTALLATION1. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent

R Pre-formed packing (Ref. Fig. 401)

Lock-wire, Fed Spec QQ-W-390, 0.032-inch diameter, or equivalent

Container, approximately two quart capacity, or equivalent

2. Referenced Procedures

22-17-00 Autopilot Flight Director System (APFDS) Hydraulic System C Monitor - Adjustment and Test

29-11-00 Hydraulic Power System - Maintenance Practices

3. Removal/InstallationA. Removal

(1) Ensure that hydraulic system C pressure is 0 psi (Ref. 29-11-00).

(2) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker R AOA (F1) when removing switch S2.

(3) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker FCES COMPUTERS AC & L AOA (B5) when removing switch S1.

(4) Open hydraulic service center access door 147AB or 147BB.

R (5) Disconnect electrical connector from applicable switch
R (Ref. Fig. 401).

(6) Place container under switch.

R (7) Remove switch from module and discard packing.

B. Installation

(1) Ensure that circuit breaker opened in Step 3A(2), or 3A(3) is open and tagged.

EFFECTIVITY: ALL

LOCKHEED



MAINTENANCE MANUAL

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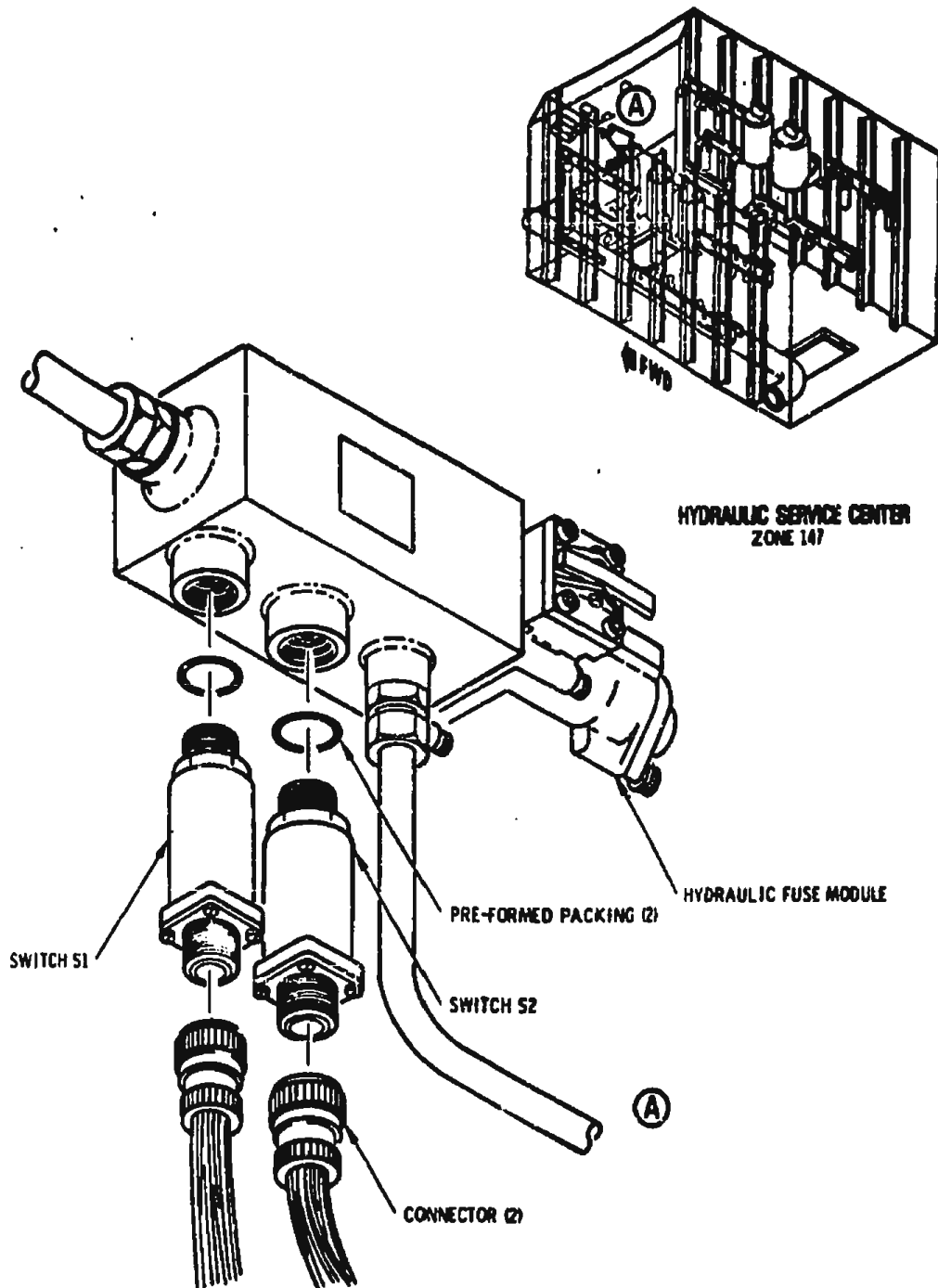
- (2) Install switch with new pre-formed packing and tighten to a torque of 275 to 300 lb inch (Ref. Fig. 401).
- (3) Connect electrical connector.
- (4) Safety switch with 0.032-inch diameter lock-wire.
- (5) Safety connector with 0.020-inch diameter lock-wire.
- (6) Remove tag and close circuit breaker opened in Step 3A(2) or 3A(3).
- (7) Perform APFDS hydraulic system C monitor adjustment and test (Ref. 22-17-00).
- (8) Close applicable hydraulic service center access door 147AB or 147BB.

EFFECTIVITY: ALL

001B

32-31-15
Page 402
Sep 15/79

LOCKHEED
MAINTENANCE MANUAL



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Hydraulic Pressure Switch - Removal and Installation
Figure 401

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EFFECTIVITY: ALL

32-31-15
Page 403/404
Nov 15/88

MAIN LANDING GEAR HYDRAULIC FUSE - MAINTENANCE PRACTICES**1. General**

The hydraulic fuse module assembly is located on the forward wall of the hydraulic service center (zone 147). This fuse prevents the loss of system C hydraulic fluid in the event of damage to the hydraulic lines to the truck leveler and/or downlock. One fuse is used for both left and right main landing gear. There are two methods of resetting the fuse.

Method One - Depressurize Hydraulic System C Reservoir (Ref. 29-11-00).

Method Two - Operate the manual bypass valve (Ref. Fig. 201).

CR NOTE: For troubleshooting main landing gear fuse problems,
CR refer to paragraph 3.C.

2. Referenced Procedure

29-11-00 Hydraulic Power System - Maintenance Practices

3. Maintenance Practice**A. Resetting Hydraulic Fuse - Method One**

- (1) Open hydraulic service center door 147AB.
- (2) Depressurize system C hydraulic reservoir (Ref. 29-11-00).
- (3) Depress hydraulic fuse indicator (Ref. Fig. 201).
- (4) Close hydraulic service center door 147AB.

B. Resetting Hydraulic Fuse - Method Two

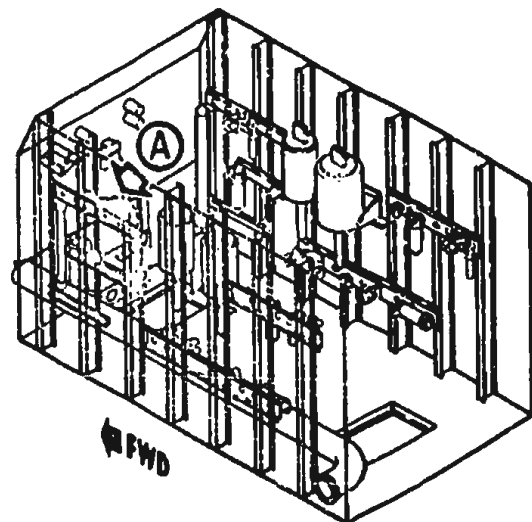
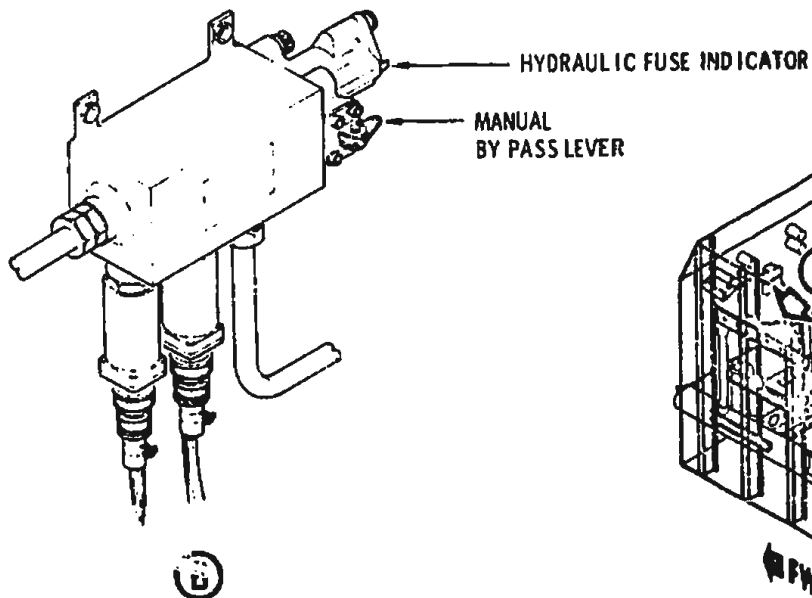
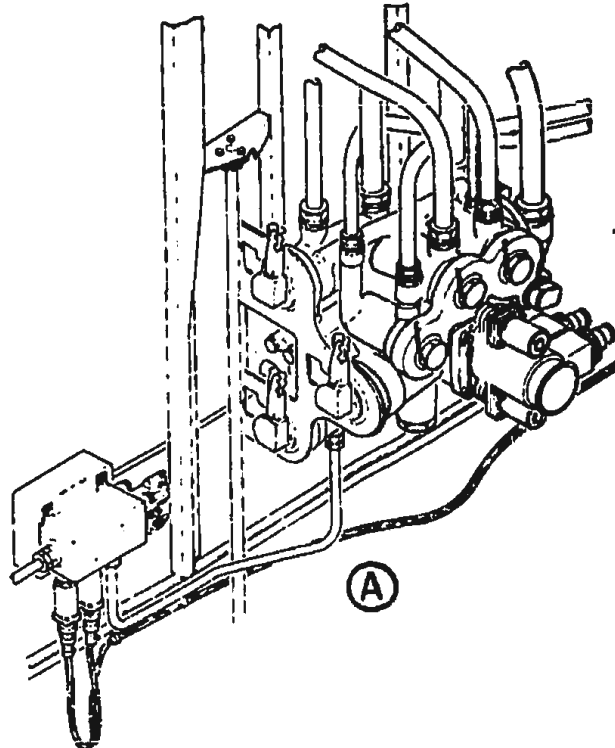
- (1) Open hydraulic service center door 147AB.
- (2) On hydraulic fuse module assembly operate manual bypass valve (Ref. Fig. 201).
- (3) Depress hydraulic fuse indicator.
- (4) Close hydraulic service center door 147AB.

EFFECTIVITY: ALL

001B

32-31-16
Page 201
Jun 15/93

LOCKHEED
MAINTENANCE MANUAL



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Main Landing Gear Hydraulic Fuse - Resetting Procedure
Figure 201

EFFECTIVITY: ALL

001B

32-31-16
Page 202
Jun 15/92

LOCKHEED
MAINTENANCE MANUAL

CR C. Troubleshooting MLG Hydraulic Fuse Set Problem

CR NOTE: The two pressure switches installed in the fuse
CR module turn on the auto ground spoiler lights, but it
CR is not an indication of a spoiler problem if the fuse
CR is tripped/set.

CR NOTE: Refer to 32-00-00/D&O for landing gear schematics.

CR NOTE: There are two components downstream of the truck fuse
CR assembly, the truck position actuator and the MLG
CR downlock/jury brace actuator, which can be leak
CR checked using the following procedures.

CR (1) Leak check the truck position actuator, TWA Stk. Nbr.
CR 12171, as follows:

CR NOTE: The truck position actuator includes valve, TWA
CR Stk. Nbr. 273-5080.

CR (a) Install MLG and NLG downlock safety pins.

CR (b) Depressurize hydraulic system C and reservoir
CR (Ref. 29-11-00); assure truck position fuse is
CR reset (Ref. 32-31-16/401).

CR NOTE: One line on truck position actuator is
CR pressurized by gear down pressure; the
CR other line is pressurized by gear up
CR pressure.

CR (c) Assure that gear selector handle is in the down
CR position.

CR (d) Disconnect the up-line at the truck position
CR actuator on left and right MLG; cap up-lines.

CR WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY
CR HYDRAULIC SYSTEM:

CR LANDING GEAR DOWNLOCK SAFETY PINS ARE
CR **INSTALLED.**

CR PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF
CR **ALL FLIGHT CONTROL SURFACES AND LANDING GEAR**
CR **DOOR TRAVEL AREAS.**

CR THE HYDRAULIC SYSTEM CAN ACCEPT HYDRAULIC
CR **PRESSURE.**

CR (e) Pressurize hydraulic system C and check for
CR leakage at check valves.

R EFFECTIVITY: ALL
R
001B

32-31-16
Page 203
Jun 15/93



MAINTENANCE MANUAL

CR
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CR

1) If a check valve is leaking, depressurize hydraulic system C, and replace applicable truck position actuator (Ref. 32-32-03/401).

CR
CR

2) If no leakage is detected or when leakage is corrected, proceed to next step.

CR
CR

(f) Depressurize hydraulic system C and reservoir (Ref. 29-11-00).

CR

(g) Reconnect up-lines to actuators.

CR
CR

(h) Disconnect the down-line at the truck position actuator on left and right MLG; cap down-lines.

CR

(i) Place gear selector handle in the up position.

CR
CR

(j) Pressurize hydraulic system C and check for leakage at check valves.

CR
CR
CR

1) If a check valve is leaking, depressurize hydraulic system C, and replace applicable truck position actuator (Ref. 32-32-03/401).

CR
CR

2) If no leakage is detected or when leakage is corrected, proceed to next step.

CR
CR

(k) Depressurize hydraulic system C and reservoir (Ref. 29-11-00).

CR

(l) Reconnect down-lines to actuators.

CR

(m) Return gear selector handle to the down position.

CR
CR

(2) Leak check MLG downlock/jury brace actuator, TWA Stk. Nbr. 10270, as follows:

CR
CR

(a) Ensure MLG and NLG downlock safety pins are installed.

CR
CR

(b) Depressurize hydraulic system C and reservoir (Ref. 29-11-00).

CR
CR

(c) Assure that gear selector handle is in the down position.

CR
CR
CR

(d) Disconnect the up and alternate down-lines at the left and right MLG downlock/jury brace actuator; cap the lines.

LOCKHEED
MAINTENANCE MANUAL

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WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY
HYDRAULIC SYSTEM:

CR
CR

LANDING GEAR DOWNLOCK SAFETY PINS ARE
INSTALLED.

CR
CR
CR

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF
ALL FLIGHT CONTROL SURFACES AND LANDING GEAR
DOOR TRAVEL AREAS.

CR
CR

THE HYDRAULIC SYSTEM CAN ACCEPT HYDRAULIC
PRESSURE.

CR
CR

(e) Pressurize hydraulic system C and check for
leakage from the alternate down port and up port.

CR
CR
CR

1) If leakage exists, depressurize hydraulic
system C, and replace applicable actuator (Ref.
32-32-02/401).

CR
CR

2) If no leakage is detected or when leakage is
corrected, proceed to next step.

CR
CR

(f) Depressurize hydraulic system C and reservoir
(Ref. 29-11-00).

CR
CR

(g) Reconnect up and alternate down-lines to
actuators.

CR
CR

(h) Disconnect the down-lines at the left and right
MLG downlock/jury brace actuator; cap the lines.

CR

(i) Place gear selector handle in the up position.

CR
CR

(j) Pressurize hydraulic sytem C and check for leakage
from the down-line ports.

CR
CR
CR

1) If leakage exists, depressurize hydraulic
system C, and replace applicable actuator (Ref.
32-32-02/401).

CR
CR

2) If no leakage is detected or when leakage is
corrected, proceed to next step.

CR
CR

(k) Depressurize hydraulic system C and reservoir
(Ref. 29-11-00).

CR

(l) Reconnect down-lines to actuators.

CR

(m) Return gear selector handle to the down position.

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EFFECTIVITY: ALL

32-31-16
Page 205
Jun 15/93

LOCKHEED



MAINTENANCE MANUAL

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- (3) When all lines have been reconnected, bleed air very slowly from left and right MLG truck position actuators (Ref. 32-32-03/401) and left and right MLG downlock/jury brace actuators (Ref. 32-32-02/401). Assure that hydraulic fuse does not reset during bleeding operation.

CR
CR
CR

- (4) Assure that hydraulic fuse is correctly reset by operating manual by-pass on the fuse (Ref. 32-31-16/401).

R EFFECTIVITY: ALL
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001B

32-31-16
Page 206
Jun 15/93

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR HYDRAULIC FUSE - REMOVAL AND INSTALLATION

1. General

The hydraulic fuse is installed in the hydraulic fuse module assembly located on the forward wall of the hydraulic service center, zone 147, (Ref. Fig. 401).

2. Equipment and Materials

Lock-wire Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent
Cap-rings (Ref. Fig. 401)

Pre-formed packings (Ref. Fig. 401)

Hydraulic fluid, LAC Specification C-34-1224, Type III, or equivalent

Wide mouth container

3. Referenced Procedures

29-11-00 Hydraulic Power System - Maintenance Practices

32-31-16 Main Landing Gear Hydraulic Fuse - Maintenance Practices

4. Removal/Installation

A. Removal

- (1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, open and tag circuit breaker AC PUMP C3 (L22) and place Maintenance in Progress tag on HYDRAULIC SYSTEM panel.
- (2) Verify that landing gear door lock safety pins are installed.
- (3) Open hydraulic service center door 147AB.
- (4) Depressurize system C hydraulic reservoir and accumulator pressure (Ref. 29-11-00).
- (5) Remove screws and washers securing fuse assembly to module (Ref. Fig. 401).

EFFECTIVITY: ALL

32-31-16
Page 401
Nov 15/88

001B



CAUTION: HANDLE FUSE ASSEMBLY WITH CARE. AVOID NICKING LANDS AND SURFACES AS HYDRAULIC FLUID LEAKAGE MAY OCCUR.

- (6) Carefully remove fuse assembly from module. (Have container to catch fluid.)

B. Installation

- (1) Verify that circuit breaker opened in Step 4A(1) is open and tagged.

CAUTION: HANDLE FUSE ASSEMBLY WITH CARE. AVOID NICKING LANDS AND SURFACES AS HYDRAULIC FLUID LEAKAGE MAY OCCUR.

- (2) Lubricate new pre-formed packings and cap rings with hydraulic fluid and install on fuse assembly, (Ref. Fig. 401).
- (3) Slide fuse assembly into bore of fuse module. Attach with screws and washers.
- (4) Lock-wire screws.

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND LANDINGGEAR DOOR TRAVEL AREAS.

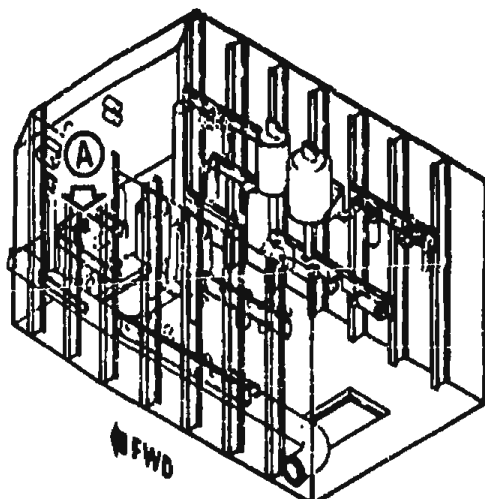
THE HYDRAULIC SYSTEM CAN ACCEPT HYDRAULIC PRESSURE.

- (5) Close circuit breaker opened in Step 4A(1) and remove Maintenance in Progress tag.
- (6) Turn on hydraulic system C pressure (Ref. 29-11-00).
- (7) Check hydraulic fuse for leaks.
- (8) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (9) Reset fuse indicator if required (Ref. 32-31-16).
- (10) Close hydraulic service center door 147AB.

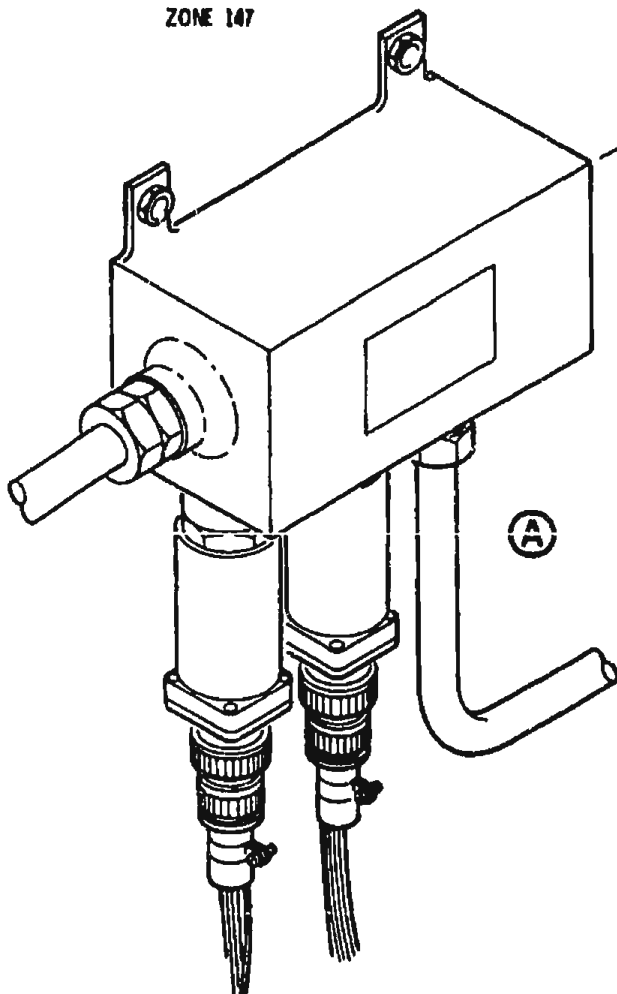
EFFECTIVITY: ALL

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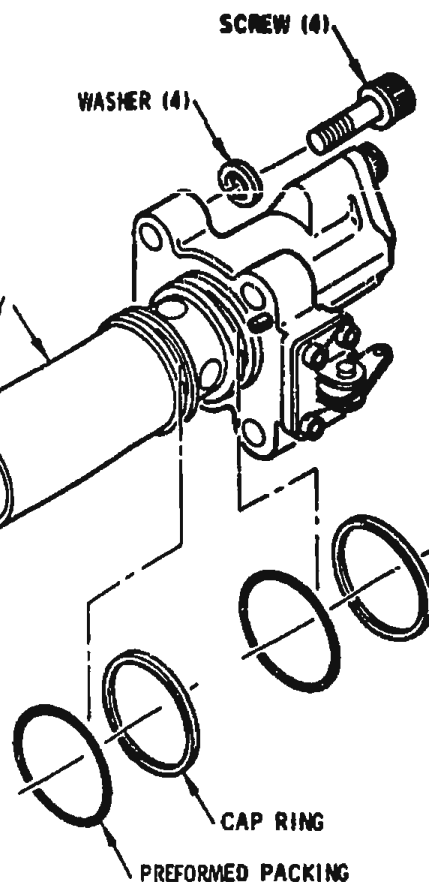
32-31-16
Page 402
Nov 15/88



HYDRAULIC SERVICE CENTER
ZONE 147



FUSE ASSEMBLY



M1-91600-32-920

Main Landing Gear Hydraulic Fuse - Removal and Installation
Figure 401

EFFECTIVITY: ALL

001B

32-31-16
Page 403/404
Nov 15/88

LOCKHEED
MAINTENANCE MANUAL

R PRESSURE REGULATOR CARTRIDGE VALVE - REMOVAL AND INSTALLATION

R 1. Equipment and Materials

R Lock-wire, Fed Spec QQ-W-390, Temp A, 0.040-inch diameter, or
R equivalent

R Hydraulic Fluid, LAC Spec C-34-1224, Type III, or equivalent

R Container wide lip 1-quart capacity

R 2. Referenced Procedure

R '29-11-00 Hydraulic Power System - Maintenance Practices

R 3. Removal/Installation

R A. Removal

R (1) Turn off hydraulic system C pressure (Ref. 29-11-00).

R (2) Place container under module to catch spilled fluid.

R (3) Using a wrench, loosen cartridge.

R (4) Unscrew cartridge and remove from module.

R B. Installation

R (1) Ensure that hydraulic system C pressure is off (Ref.
R 29-11-00).

R (2) Inspect cartridge seals and packing for wear and
R damage. Replace as required.

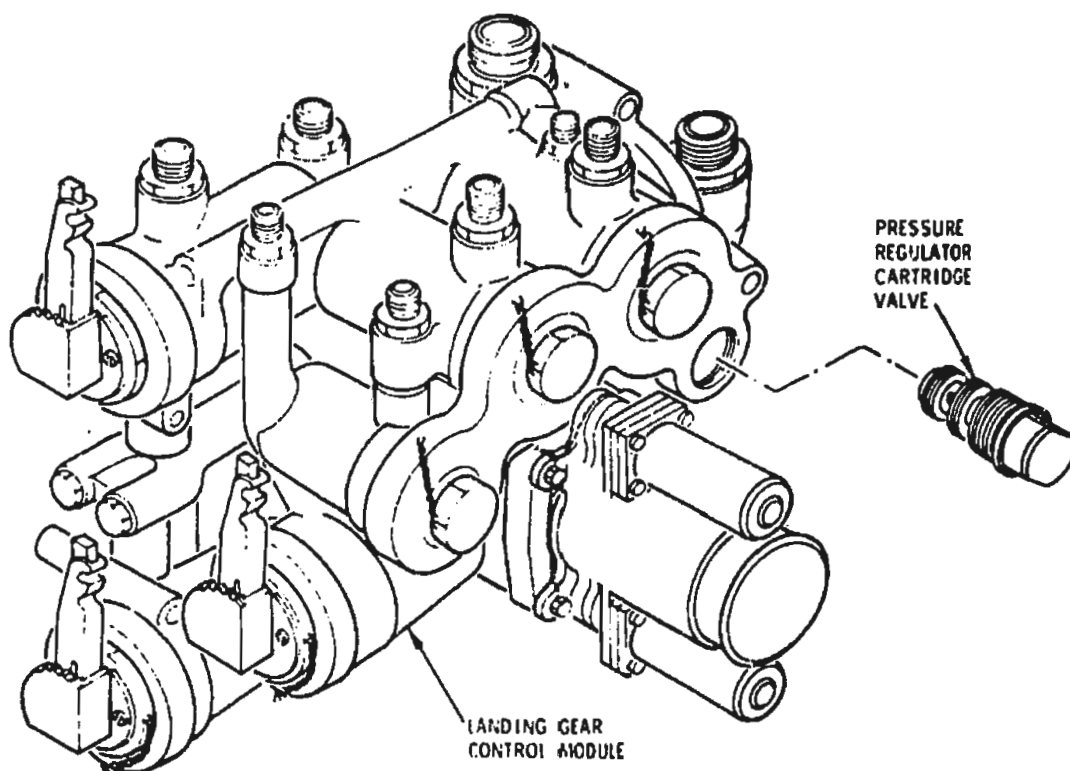
R (3) Lubricate seals, packing, and module bore with
R hydraulic fluid.

R (4) Install cartridge in module bore, torque 80 (± 10) lb
R in., and lock-wire.

R EFFECTIVITY: ALL
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0018

32-31-18
Page 401
Dec 15/79

LOCKHEED
MAINTENANCE MANUAL



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A11-0100-32-243

Pressure Regulator Cartridge Valve - Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-31-18
Page 402
Dec 15/79

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LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR EXTENSION AND RETRACTION
DESCRIPTION AND OPERATION

1. General

Main landing gear (MLG) extension and retraction is cycled by hydraulic power. The system consists of the following:

- An extend and retract actuator
- An uplock mechanism integral with the door actuating system
- A downlock mechanism
- An articulating side brace
- An articulating jury brace
- A mechanical downlock position indicating mechanism
- Flow control valves
- R Phase control modules
- Check valves
- A landing gear selector valve
- A landing gear control lever
- A landing gear position indicating and monitoring system.

2. Operation

Normal landing gear extension and retraction is controlled by the landing gear lever located on the pilots center instrument panel, zone 210. The lever has three positions: DOWN, NEUTRAL, and UP. A solenoid released downlock prevents lever movement out of the DOWN position when the aircraft is on the ground. The solenoid is energized and the downlock released only after the aircraft is airborne. Both MLG trucks must be level and both struts fully extended. A downlock release button next to the landing gear lever permits manual release of the downlock in event the solenoid remains deenergized.

R When the lever is placed in the UP position, the MLG inboard
R doors unlock and open, the gear downlock releases, and the gear
R retracts. When the gear reaches the UP position, the MLG
R inboard doors close and lock. The NLG doors are mechanically

EFFECTIVITY: ALL

32-32-00
Page 1
May 15/82

LOCKHEED
MAINTENANCE MANUAL

closed by linkage attached to the nose gear and the gear is retained in the up position by a nose gear uplock and the jury brace assembly.

Moving the landing gear lever to the NEUTRAL position removes hydraulic system C power from the gear. The MLG is then retained in the retracted position by the MLG door linkage. When the lever is placed in the DOWN position, the MLG door and nose gear uplocks release. The MLG doors open and the gear extends. When the MLG is fully extended the gear downlocks engage, and the MLG doors close. The nose gear doors are mechanically opened as the gear extends. The nose gear is then locked in the down position by the nose gear drag brace and jury brace assemblies.

Mechanical alternate gear extension is provided by using release handles located aft of the pilots center console, zone 210. Mechanical alternate extension of the gear is accomplished through cables that disengage the door uplocks. Once the doors have opened, aerodynamic forces aid the gear to free-fall. Positive locking of the gear in the down position is accomplished by downlock springs. The MLG doors will remain open when the gear is extended by the mechanical alternate system. Hydraulic power stored in the alternate brake system accumulator (system C) may be also used for hydraulic alternate extension. The control switch for this system is located next to the mechanical alternate handles. Use of the alternate brake system accumulator hydraulic power provides positive gear extension similar to normal extension except that a runaround condition is created through the bypass valve in lieu of the runaround valve to allow the MLG actuator to extend. In addition, the MLG Inboard Doors remain open.

The landing gear hydraulic selector valve is electrically controlled by the landing gear control switch. With the switch in the UP position, the selector valve connects hydraulic system C pressure to the gear-up lines for the MLG and NLG through the landing gear bypass valve in its normal position. Pressure is also provided to the spin down valve, which routes reduced pressure to the brakes to stop wheel rotation. Flow to each MLG is regulated at 23 gpm to ensure uniform flow to each side for symmetrical operation.

Sequencing of the MLG doors and gear extension or retraction is controlled by the phase control module. When the landing gear lever is placed in the UP position, pressure is ported to the door-open line of both the door uplock actuator and the inboard door actuating cylinder to the downlock actuator, and to the up side of the MLG actuator. The return (down) flow from the MLG actuator is blocked in the phase control module at the beginning of the cycle to prevent MLG retraction. As the MLG door opens, it activates the door-operated valve through mechanical linkage.

EFFECTIVITY: ALL

32-32-00

Page 2
May 15/82



MAINTENANCE MANUAL

R When the door-operated valve opens, pressure is ported to the
R differential priority valve and the runaround valve. This
R action opens the down line to permit operation of the downlock
R actuator and the MLG actuator. The downlock actuator raises the
R hinge joint in the jury brace from the over-center position and
R pulls the side brace hinge joint off the center position, which
R permits the upper side brace to fold as the gear retracts.
R Movement of the upper side brace positions the gear-operated
R valve through mechanical linkage. This action ports MLG up
R pressure to the door-close line and ports the door-open line to
R return. As the MLG inboard door closes, pressure is also ported
R to the door uplock actuator to secure the door fully closed.

R When the landing gear lever is placed in the DOWN position,
R pressure is ported to the door-open lines of both the door
R uplock actuator and the inboard door actuating cylinder.
R Pressure is also ported to the MLG jury brace actuator extend
R line. Both MLG actuator lines are blocked in the phase control
R module at the beginning of the cycle to prevent MLG extension.
R As the MLG inboard door opens, it activates the door-operated
R valve through mechanical linkage. When the door-operated valve
R opens, pressure is ported to the runaround valve. Metered fluid
R pressure moves the valve and ports gear down pressure to both
R MLG actuator lines. Design of the the MLG actuator (with
R greater down pressure area) and gear weight permits extension of
R the MLG. As the MLG reaches a full extended position, the MLG
R jury brace actuator, together with the jury brace springs,
R lowers the jury-brace hinge joint to an over center position,
R acting as a positive downlock. As the MLG extends, movement of
R the upper side brace positions the gear operated valve through
R mechanical linkage. This action ports MLG down pressure to the
R door-close line, ports door open line to return, and maintains
R pressure in both MLG actuator lines. As the MLG inboard door
R closes, pressure is ported to the door uplock actuator to secure
R the door fully closed.

The MLG is mechanically supported in the retracted position by two spring-oil, shock absorbers. One (uplock snubber) which is located at the outboard end of the truck attachment pin, engages a mating surface on the door link. The other (upstop snubber), which is located at the inboard end of the upper torque link attachment pin, engages a mating surface at the inboard end of the lateral brace. This support arrangement permits the door uplock mechanism to serve also as a landing gear uplock.

R Improper truck position activates the landing gear lever
downlock solenoid to prevent lever movement to the UP position.
The lever downlock can be released manually, and the gear can be
retracted if conditions warrant such action. Mechanically
R driven downlock indicator buttons that protrude through the
R upper surface of each wing are provided to confirm MLG extend

EFFECTIVITY: ALL



R position in the event of a malfunction in the normal monitoring
R system.

R The landing gear control module is located in the hydraulic
R service center, zone 147. The phase control modules are located
R in the wheel wells. The components installed in the modules are
R line-replaceable units. Manual shutoff valves are installed in
R each module to provide independent landing gear system shutoff
during ground maintenance, fault isolation, and system checkout.
MLG doors can be opened from the ground for maintenance without
special tools.

3. Main Landing Gear Retract Actuator Assembly

A. Description

The MLG retract actuator (Ref. Fig. 1) consists of a conventional hydraulic cylinder and piston. The actuator, one each located in zones 542 and 642, is attached at the cylinder end (top) by a single pin to lugs that are integral with the landing-gear-to-wing attachment fitting in the wing torque box. The piston rod end (bottom) is attached to the MLG shock strut by a single attachment pin. The actuator has a relief valve assembly bolted to the lower end of the cylinder and an external fluid transfer tube that connects the relief valve to the cylinder gear-up port. An extended skirt on the piston modulates the gear-up pressure at the gear-up port to provide snubbing action during the last part of piston travel to the gear-up position.

4. Main Landing Gear Jury Brace Actuator Assembly

A Description and Operation

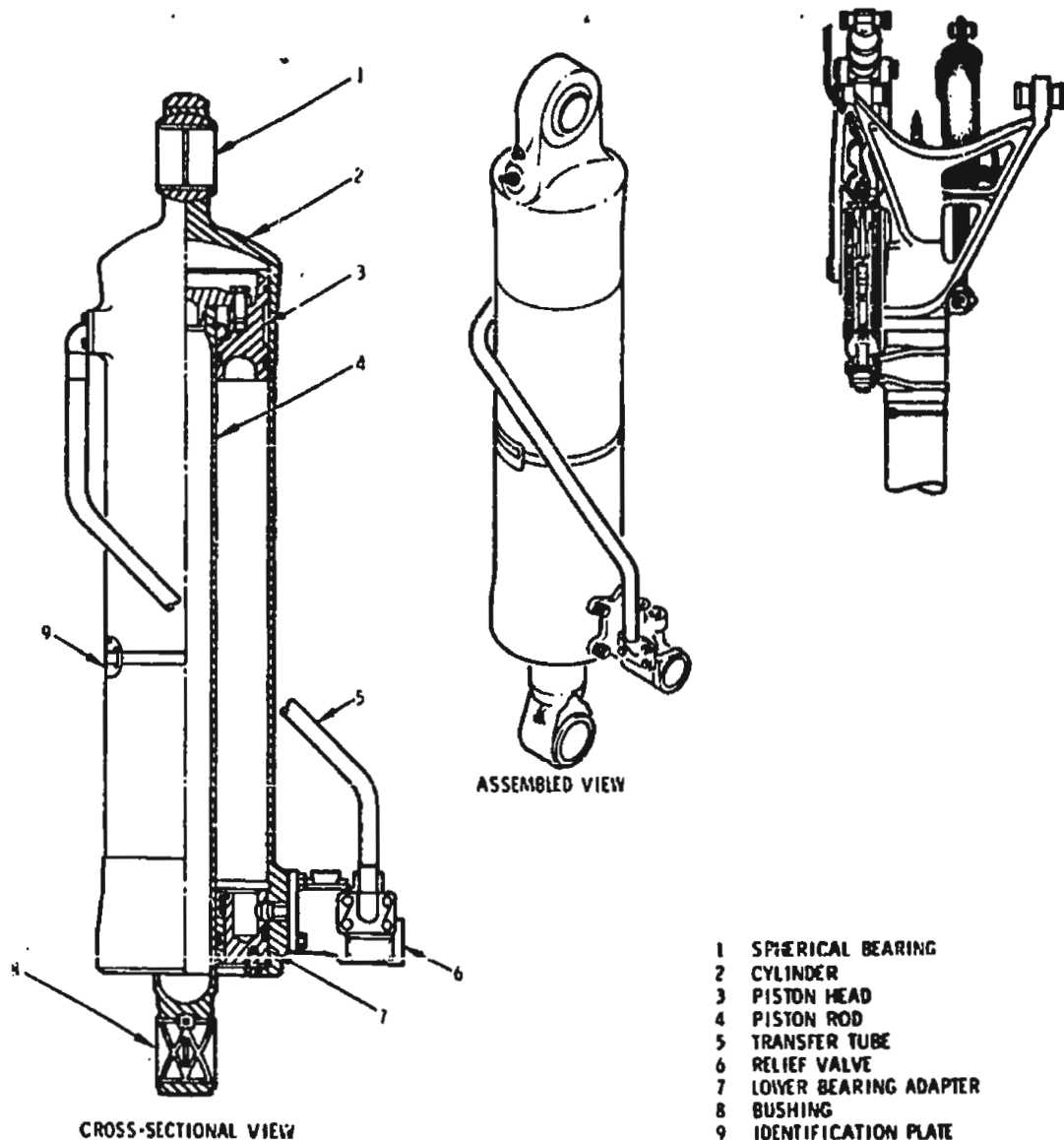
The MLG jury brace actuator (Ref. Fig. 2) consists of a hydraulic actuator, a manifold, and a shuttle valve. The actuator consists of a conventional cylinder and piston which incorporates a hydraulically inhibited snubber to retard piston travel rate as the piston approaches the extended position. A bleed valve is incorporated to relieve hydraulic pressure for maintenance purposes. The manifold distributes hydraulic fluid to the extend and retract ports. The shuttle valve provides a means to apply alternate brake system accumulator pressure to the extend port for jury strut alternate down-lock operation.

5. Main Landing Gear Truck Positioner Assembly

A. Description and Operation

EFFECTIVITY: ALL

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MAINTENANCE MANUAL



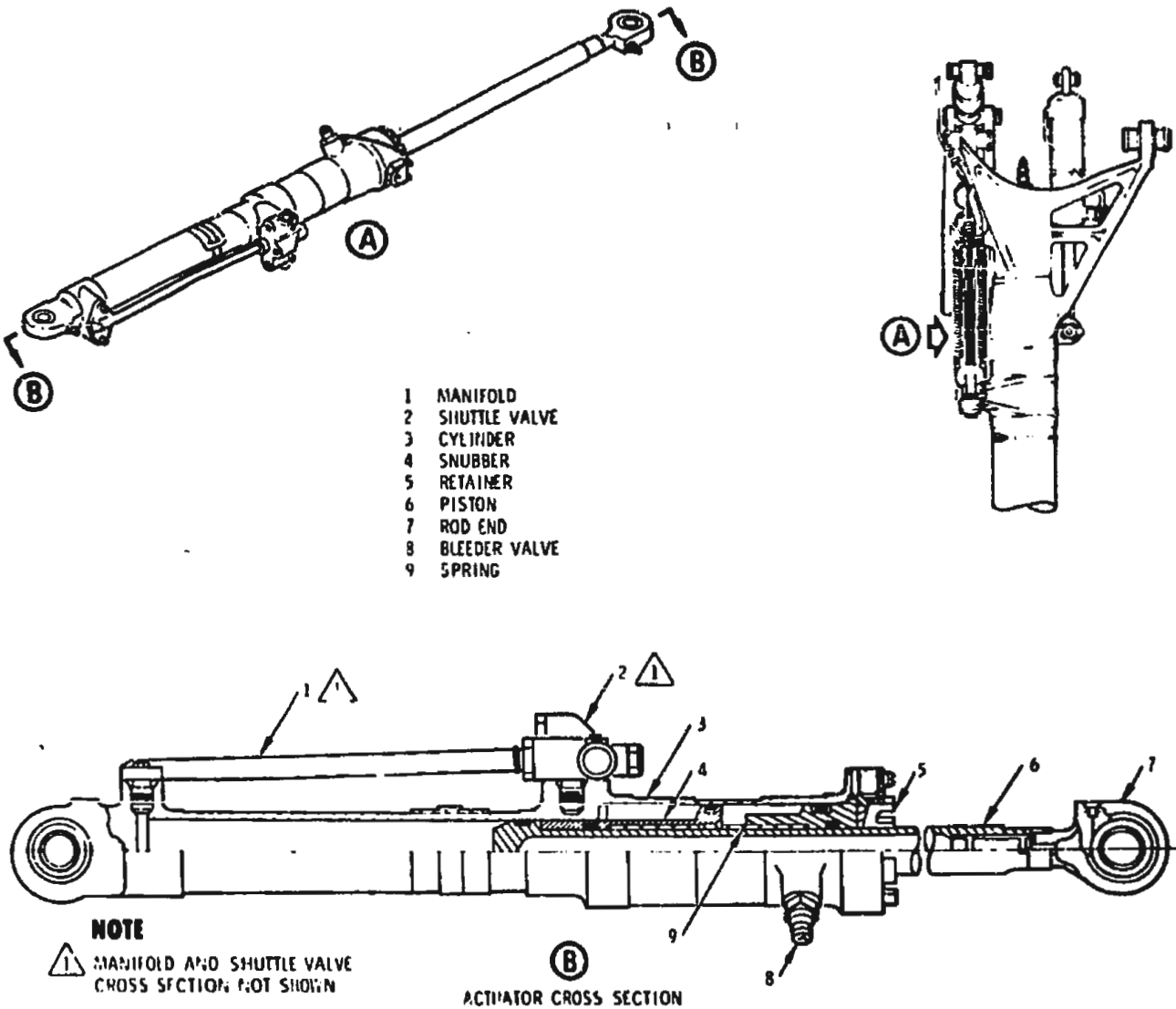
HH 8544
A11-0100-32-186

Main Landing Gear Retract Actuator Assembly
Figure 1

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018B EFFECTIVITY: ALL

32-32-00
Page 5
Feb 15/77

LOCKHEED
MAINTENANCE MANUAL



HH 8605
M1-0.00-32-187

Main Landing Gear Jury Brace Actuator
Figure 2

EFFECTIVITY: ALL

32-32-00
Page 6
Dec 1/71

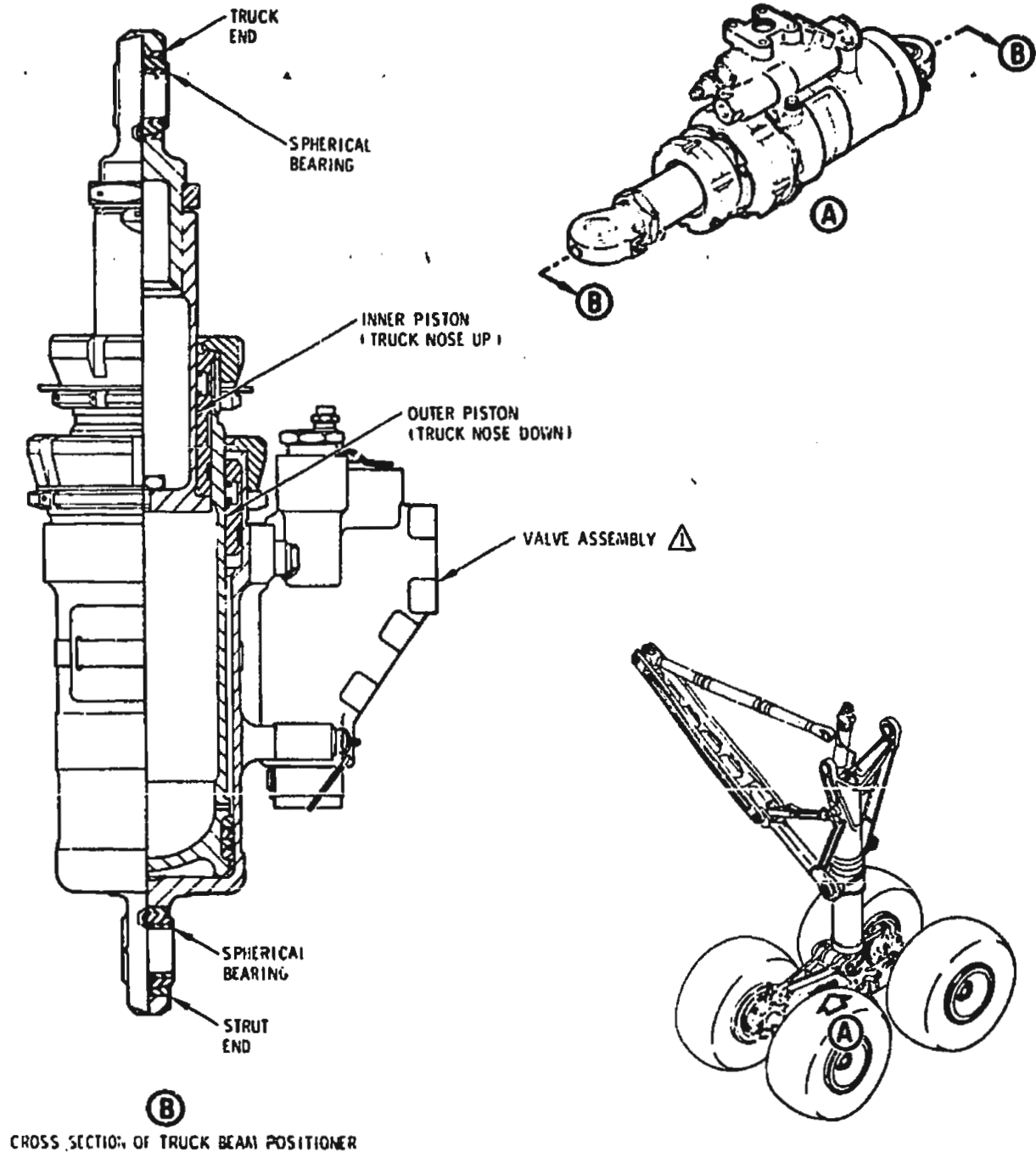


The MLG truck positioner (Ref. Fig. 3) is a hydraulic actuator with a cylinder containing two concentric pistons and a valve assembly.

The actuator is mounted between the base of the MLG shock strut cylinder and the truck lower torque arm attachment lugs. The actuator supplies the forces required to maintain the truck in a neutral position (90 degrees with respect to the shock strut) whenever the truck position is displaced by an external force.

The valve assembly (Ref. Fig. 4) is mounted directly on the actuator cylinder. The valve assembly consists of a relief valve, a pressure regulating valve, and two check valves with orifices to control the flow. The valve maintains inlet pressures to the actuator at sufficient internal pressures within the cylinder to control piston movement. This movement in either direction is needed to return the truck to the neutral position (the required position for retraction). Internal pressure maintained by the valve also results in a dampening action against truck oscillation.

LOCKHEED
MAINTENANCE MANUAL



NOTE
⚠ VALVE ASSEMBLY
CROSS SECTION NOT SHOWN

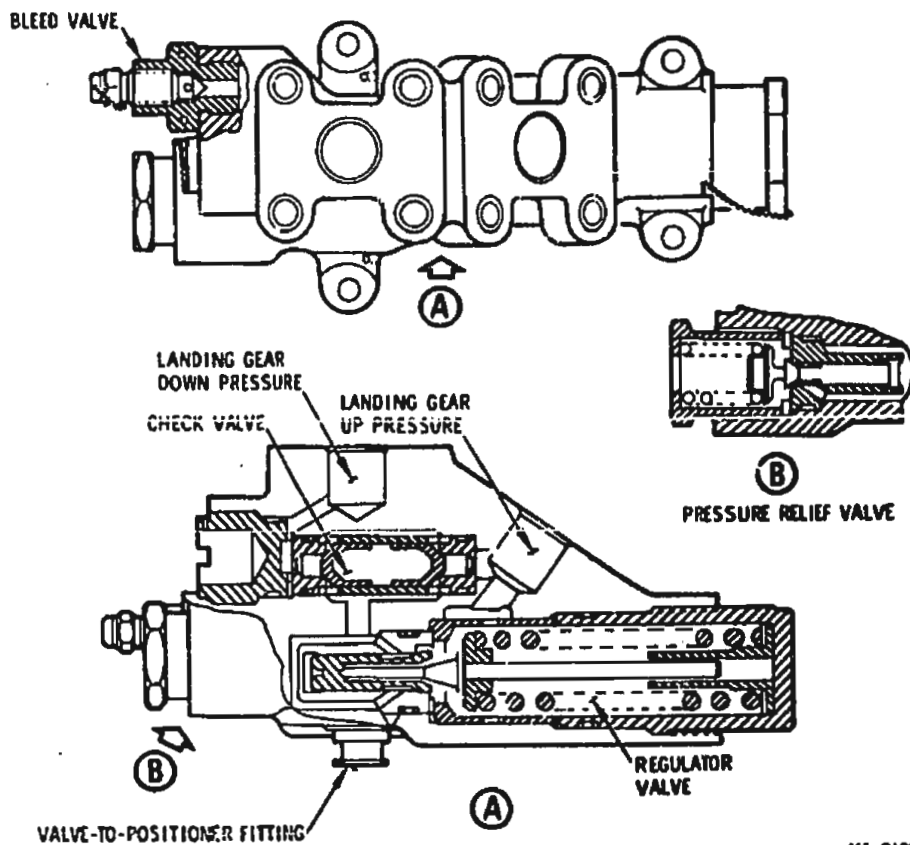
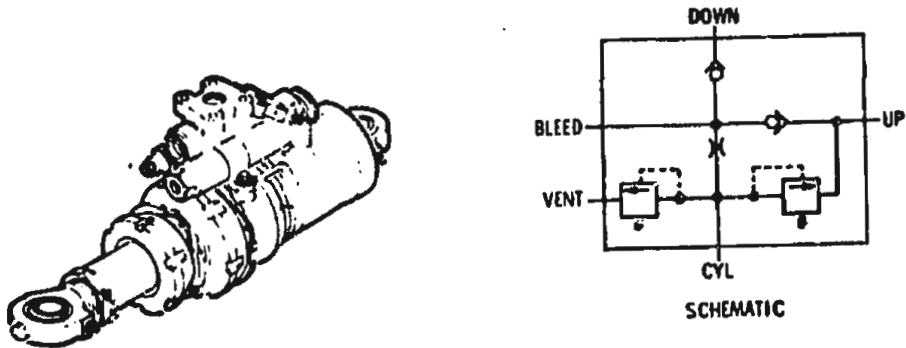
MH 8695
M1-0100-32-193

Main Landing Gear Truck Positioner
Figure 3

R R
018B EFFECTIVITY: ALL

32-32-00
Page 8
Feb 15/77

LOCKHEED
MAINTENANCE MANUAL



HM 8476
M1-0100-32-192

Main Landing Gear Truck Positioner Hydraulic Valve
Figure 4

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0188 EFFECTIVITY: ALL

32-32-00
Page 9/10
Feb 15/77

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR EXTENSION AND RETRACTION WITH DOORS OPEN
MAINTENANCE PRACTICES

1. General

These procedures are to be used to extend and retract the main landing gear (MLG) when the MLG inboard doors are disconnected from the inboard door actuator links. The procedures are presented for one gear; the opposite gear is operated in the same manner.

2. Equipment and Materials

Cotter Pin, MS24665-151, or equivalent

Jacking Adapter Set, Spec Tool Co., PN STC 90517-17, or equivalent

Forward Fuselage Jack (30-ton capacity), Malabar Mfg. Co., Model 733, or equivalent

Wing Jack (100-ton capacity), Malabar Mfg. Co., Model 792B, or equivalent

3. Referenced Procedures

7-11-00 Wing and Fuselage Jacking - Maintenance Practices

24-00-00 External Power - Maintenance Practices

29-11-00 Hydraulic Power System - Maintenance Practices

R 32-33-00 Main Landing Gear Inboard Door - Maintenance Practices

4. Retraction and Extension

A. Preliminary Procedures

- (1) Install downlock safety pins in nose landing gear (NLG) and MLG not being retracted.
- (2) Place an index mark on phase control linkage bellcrank and bellcrank hanger to show door closed position.
- (3) Open both MLG inboard doors and install inboard door actuator locks (Ref. 32-10-00).

EFFECTIVITY: ALL

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32-32-00
Page 201
Nov 15/77

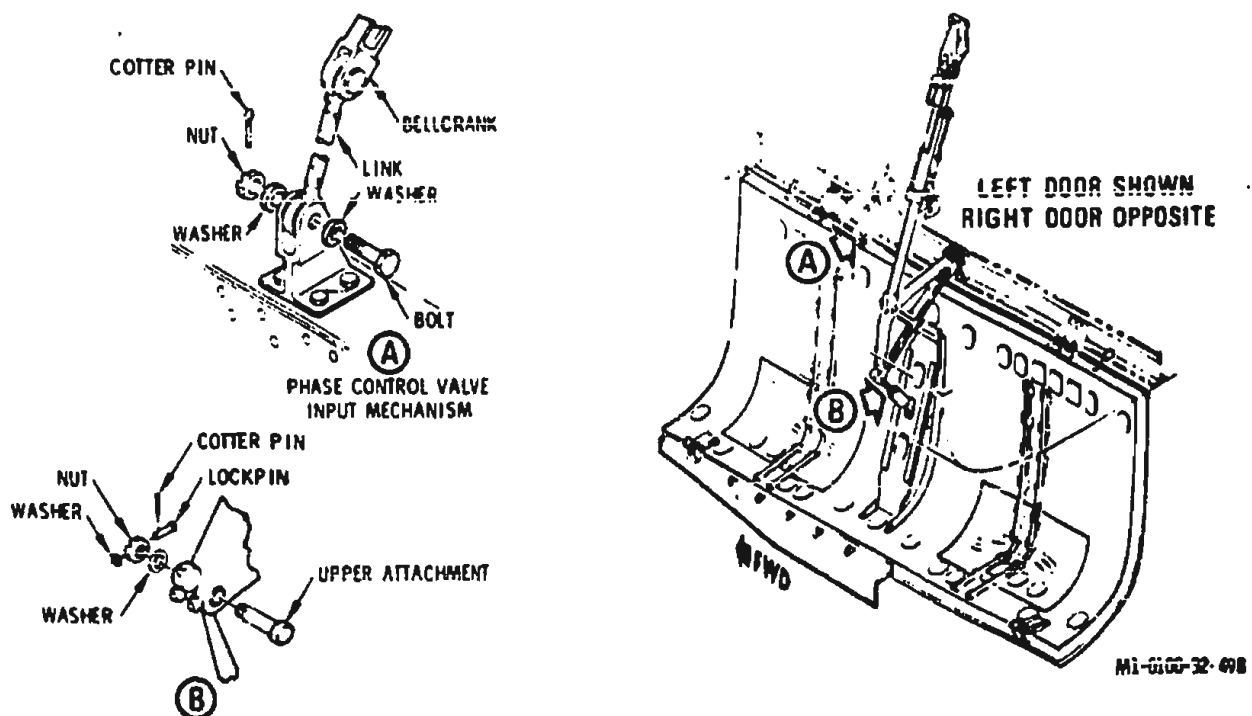
LOCKHEED
MAINTENANCE MANUAL

- (4) Place an index mark on phase control linkage bellcrank and bellcrank hanger to show door open position, then disconnect link from door (Ref. Fig. 201).
- (5) Disconnect inboard door rod from door actuator link by removing upper attachment pin.

R (6) Jack aircraft for MLG retraction (Ref. 7-11-00).

R B. Retraction

- (1) Remove inboard door actuator lock.
- (2) Turn on electrical power (Ref. 24-00-00).
- (3) Verify that LANDING GEAR control lever is in DOWN position, and that phase control linkage bellcrank is in door open position.



Main Landing Gear Inboard Door Rod and Phase Control
Linkage Disconnect
Figure 201

EFFECTIVITY: ALL

0018

32-32-00
Page 202
May 15/82



MAINTENANCE MANUAL

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED ON LANDING GEAR AND DOOR NOT BEING RETRACTED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES, LANDING GEAR, AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (4) Pressurize hydraulic system C and set flow rate to 25 gpm (Ref. 29-11-00).
- (5) Stow door ground operation D-handle to fully retracted position. Door actuator link will immediately move to closed and locked position.
- (6) Position LANDING GEAR control lever to UP. Simultaneously, door uplock will be released and gear will begin to retract.

NOTE: With the MLG locked in the up position, the LANDING GEAR control lever may be positioned to NEUTRAL and hydraulic system C pressure and electrical power may be turned off.

C. Extension

- (1) Manually rotate phase control linkage bellcrank upward to door closed position.

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED ON LANDING GEAR AND DOOR NOT BEING EXTENDED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES, LANDING GEAR, AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (2) Pressurize hydraulic system C and set flow rate to 25 gpm (Ref. 29-11-00).

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EFFECTIVITY: ALL

32-32-00
Page 203
May 15/82

LOCKHEED
MAINTENANCE MANUAL

WARNING: VERIFY THAT MLG AREA IS CLEAR OF PERSONNEL AND EQUIPMENT.

- (3) Turn on electrical power (Ref. 24-00-00).
- R (4) Manually rotate the phase control linkage bellcrank to the door open position.
- R (5) Position LANDING GEAR control lever to DOWN. Either of following conditions will result.
- (a) Door uplock will release and door actuator link will lower to door open position. MLG will extend and lock down, and door actuator link will return to closed position.
- (b) Door uplock will release and door actuator link will lower to door open position. MLG will not fully extend and door actuator link will remain in open position. If gear extends to a position approximately 20 degrees or less than fully extended, door may close.
- R (6) When gear extends and locks down, and door actuator link retracts, or when gear does not lock down and door actuator extends, perform the following to obtain a gear locked down and door actuator link extended condition:
- (a) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (b) In flight station, zone 210, verify that alternate brake system pressure is a minimum of 2000 psi.
- (c) Lift cover and position ALTERNATE HYDRAULIC LANDING GEAR EXTENSION switch to ALTN for 20 seconds, then return switch to NORMAL position. Door link will now be in door open position and MLG will be in down and locked position.
- R (7) Install MLG inboard door actuator lock (Ref. 32-10-00).

D. Completion Procedures

- (1) Connect inboard door rod to door actuator link (Ref. Fig. 201).
- (2) Connect phase control linkage to door.
- (3) Close MLG inboard door (Ref. 32-10-00).

EFFECTIVITY: ALL

001B

32-32-00
Page 204
Nov 15/86

- (4) Verify that LANDING GEAR control lever is in DOWN position.

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED ON LANDING GEAR AND DOOR NOT BEING RETRACTED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES, LANDING GEAR, AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (5) Pressurize hydraulic system C (Ref. 29-11-00) and set flow rate to 13 gpm.
- (6) Position LANDING GEAR control lever to UP.
- (7) Verify that door opens, landing gear retracts, and door returns to closed position without interference.
- (8) Position LANDING GEAR control lever to NEUTRAL.
- (9) Verify that door does not open and landing gear remains retracted.
- (10) Position LANDING GEAR control lever to DOWN.
- (11) Verify that door opens, landing gear extends, and door returns to closed position without interference.
- (12) Install downlock safety pin in MLG.
- (13) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (14) Verify that door remains in closed position.
- (15) If door does not remain closed, close door in accordance with 32-10-00, maintenance practices.
- (16) Lower aircraft and remove jacks (Ref. 7-11-00).
- (17) Turn off electrical power (Ref. 24-00-00).



MAINTENANCE MANUAL

MAIN LANDING GEAR RETRACT ACTUATOR ASSEMBLY
REMOVAL AND INSTALLATION1. Equipment and Materials

Cotter Pin, MS24665-153, or equivalent

R Grease, Royco 11 MS, or equivalent

Hydraulic Service Dolly, Loe Industries, Model No. 550LP, or equivalent

Portable Hoist, Wadell Equipment Co., PN WE3981, or equivalent

Work Platform, Adjustable, or equivalent

MLG Actuator Hoisting Adapter Set, PN B961, or equivalent

MLG Actuator Pin Replacement Tool Set, PN B966, or equivalent

2. Referenced Procedures

10-10-00 Towing - Maintenance Practices

29-11-00 Hydraulic Power System - Maintenance Practices

32-10-00 Main Landing Gear Inboard Door - Maintenance Practices

3. Removal/Installation

A. Removal

- (1) Install left and right MLG and NLG downlock safety pins (Ref. 10-10-00).
- (2) Open applicable MLG inboard door and install MLG door actuator lock (Ref. 32-10-00).
- (3) Ensure that hydraulic system C pressure is 0 psi (Ref. 29-11-00).
- (4) At upper end of actuator, bleed off any residual hydraulic pressure using bleed fitting.
- (5) Disconnect the two hydraulic lines at actuator. Tag lines to ensure correct installation.

EFFECTIVITY: ALL

001B

32-32-01
Page 401
Dec 15/93



MAINTENANCE MANUAL

- (6) Remove reducers from actuator parts. Plug actuator ports and hydraulic lines.
- (7) Disconnect upper end of actuator as follows (Ref. Fig. 401):
 - (a) Remove cotter pin and nut from upper actuator pin thru-bolt.
 - (b) Remove endcaps, thru-bolt, antirotation washers, and spacers.
 - (c) Using MLG actuator pin replacement tool (Ref. Fig. 402), remove upper actuator pin.
- (8) Displace upper end of actuator from aircraft structure fitting far enough to permit installation of MLG actuator hoisting adapter set. Use strap to secure actuator to strut.
- CR (9) Install hoisting adapter set and portable hoist.
- (10) With upper end of actuator supported by hoist, disconnect lower end of actuator as follows (Ref. Fig. 401):
 - (a) Remove cotter pin and nut from lower actuator pin thru-bolt.
 - (b) Remove thru-bolt.
 - (c) Remove both endcaps.
 - (d) Using MLG actuator pin replacement tool (Ref. Fig. 402), remove lower actuator pin.
- (11) Using portable hoist, lower actuator.

B. Installation

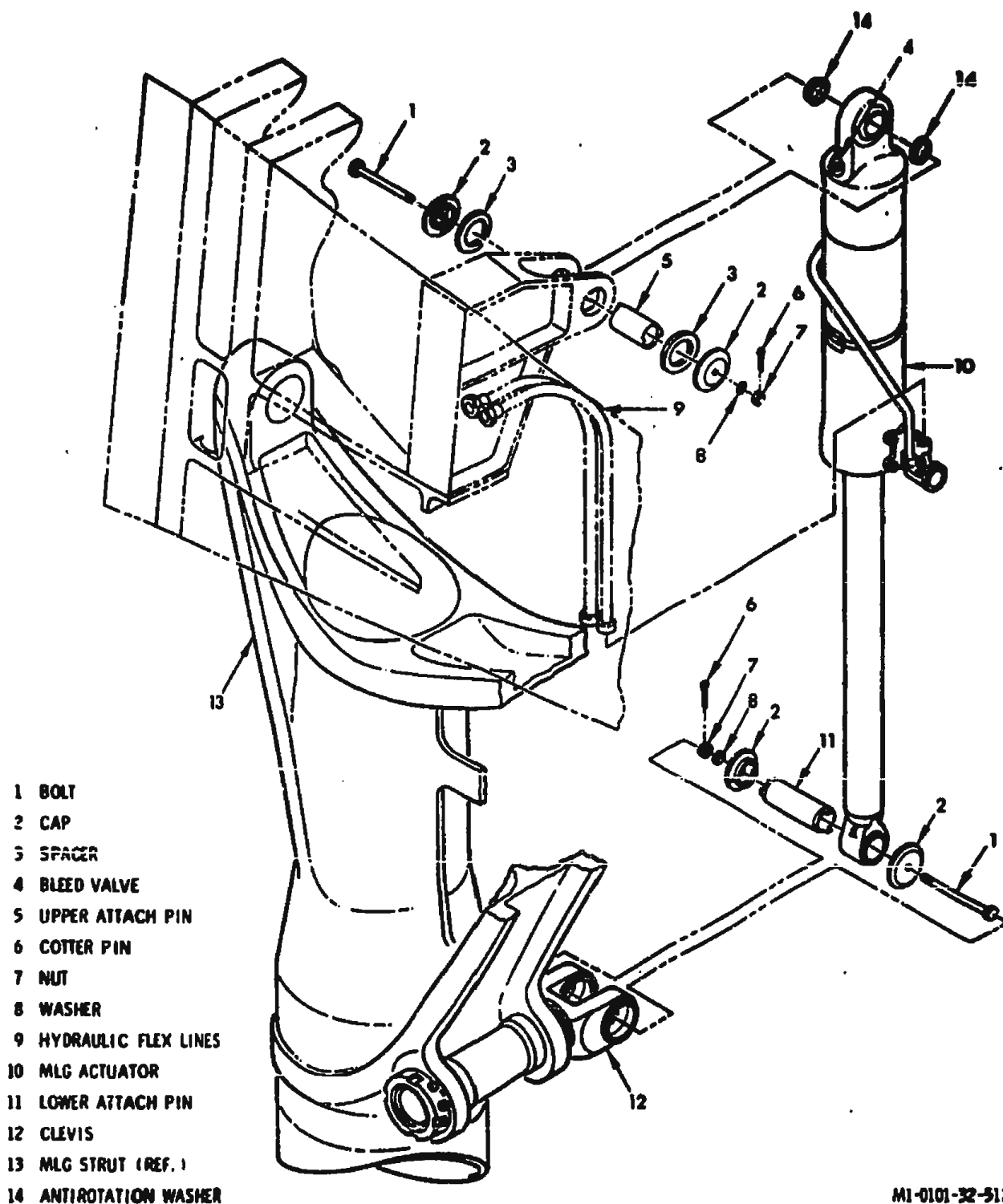
- CR (1) Using portable hoist or other suitable means, raise
CR actuator into position.
- CR (2) Connect upper end of actuator to structure fitting as
CR follows:
 - CR (a) Position upper end of actuator into strut fitting.
 - CR (b) Coat upper actuator pin with grease.

EFFECTIVITY: ALL

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32-32-01
Page 402
Mar 15/91

LOCKHEED
MAINTENANCE MANUAL



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Main Landing Gear Actuator - Removal and Installation
Figure 401

EFFECTIVITY: ALL

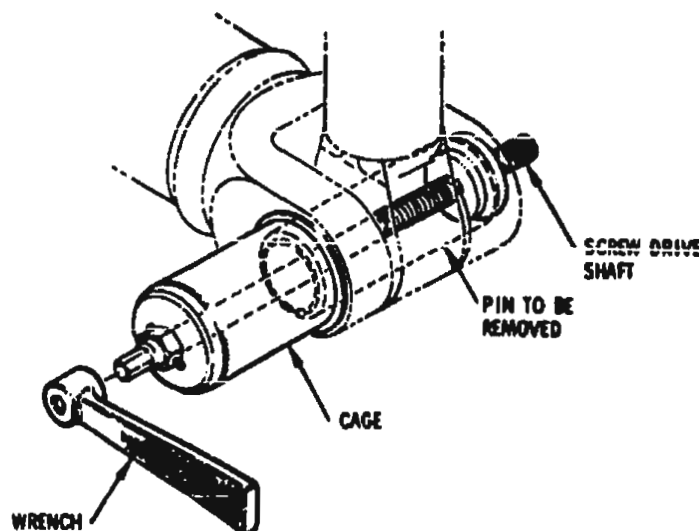
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32-32-01
Page 403
Sep 15/79



MAINTENANCE MANUAL

- (c) Using MLG actuator replacement tool (Ref. Fig. 403), install upper actuator pin and antirotation washers (Ref. Fig. 401).
- (d) Install spacers, upper endcaps, through-bolt, nut, and cotter pin.
- (e) Inspect reducer o-rings for damage or deformation. Replace as required.
- (f) Install reducers in actuator ports.
- (3) Ensure that lower rod end of actuator is clear of structure and has sufficient clearance to be extended and retracted. Ensure that actuator rod is clear of strut.
- WARNING:** DO NOT PRESSURIZE ACTUATOR DOWN PORT ABOVE 500 PSI UNLESS UP PORT IS EQUALLY PRESSURIZED. PISTON HEAD ATTACH BOLTS CANNOT WITHSTAND LOAD APPLIED WHEN ONLY DOWN PORT IS PRESSURIZED WITH PISTON RESTRAINED.
- (4) Connect aircraft hydraulic lines to actuator. Assure that lines are connected correctly and remove tags.



WH 6402
MI-ACC-32-125

Main Landing Gear Actuator Pin - Removal
Figure 402

EFFECTIVITY: ALL

32-32-01
Page 404
Dec 15/91



CR
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CR

CAUTION: ASSURE THAT ALL THREE GEAR PINS ARE INSTALLED AND AIRCRAFT IS CLEARED PRIOR TO PRESSURIZING HYDRAULIC SYSTEM.

CR

(5) Turn on "C" hydraulic system a/c motor pump.

CR
CR
CR

(6) Open bleed fitting at upper end of actuator slowly and bleed air out of actuator until clear fluid is expelled from bleed fitting.

CR
CR

(7) Support actuator and keep clear of surrounding structure while operating.

CR
CR
CR

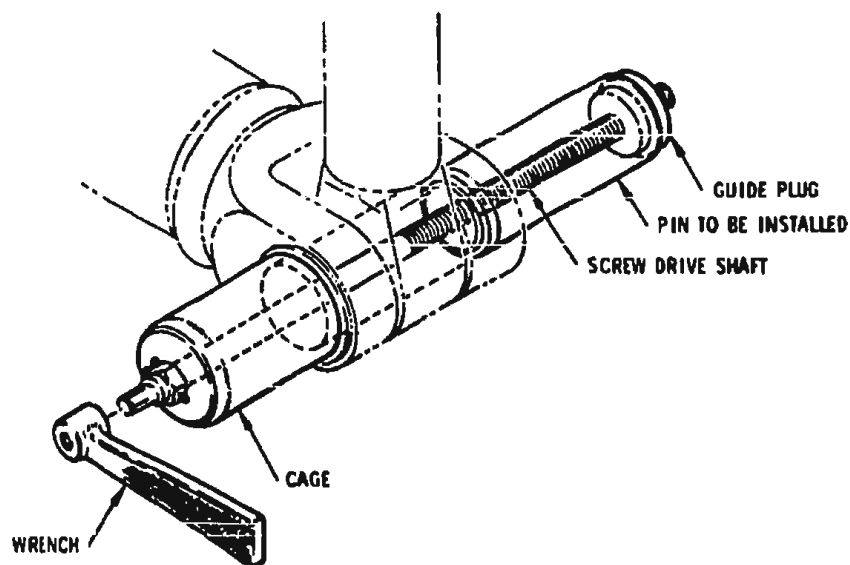
(8) Close bleed fitting and operate actuator several times by operating the gear handle to assure that all air is bled from the actuator.

CR
CR

(9) Connect actuator to strut. Install pin endcaps, thru-bolt, nut, and cotter pin.

CR

(10) Remove MLG door actuator lock and close MLG inboard door (Ref. 31-10-00).



HH 6433
ML-A00-32-128

CR
CR

Main Landing Gear Actuator Pin - Installation
Figure 403

R
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EFFECTIVITY: ALL

32-32-01
Page 405/406
Mar 15/91

MAIN LANDING GEAR JURY BRACE ACTUATOR - REMOVAL AND INSTALLATION**1. Equipment and Materials**

- R Bucket (1-gallon minimum)
- R Cotter Pin, MS24665-153, or equivalent
- R Downlock Spring Tool Assembly, Dwg No. B698, or equivalent
- R Grease, Ref. MM 12-20-00, Lubrication, Scheduled Servicing
- R Ladder, six foot platform, or equivalent
- R Lock-wire, Fed Spec QQ-W-390 cond A, 0.032 inch diameter, or
R equivalent
- R Preformed packings (o-rings)
- R Protective caps and plugs

2. Referenced Procedures

- 29-11-00 Hydraulic Power System - Maintenance Practices
- 32-10-00 Main Landing Gear Inboard Door - Maintenance
Practices

3. Removal/Installation**A. Removal**

- (1) Install main landing gear (MLG) and nose landing gear (NLG) downlock safety pins.
- (2) Open MLG inboard door (Ref. 32-10-00).
- R (3) Ensure hydraulic system C pressure and system C
R reservoir pressure are 0 psi. Use reservoir dump valve
R as required (Ref. 29-11-00).

WARNING: EACH DOWNLOCK SPRING EXERTS A FORCE OF 150 POUNDS. FAILURE TO RESTRAIN SPRINGS DURING REMOVAL COULD RESULT IN SERIOUS INJURY TO PERSONNEL.

- R (4) Install downlock spring tool assembly on one downlock
spring assembly as shown in Fig. 401.

EFFECTIVITY: ALL

001B

32-32-02
Page 401
Jun 15/94



MAINTENANCE MANUAL

- (5) Adjust tool assembly to restrain spring and to prevent explosive disassembly upon removal of attaching parts.
- (6) At upper end of downlock spring assembly, remove upper downlock spring pin that secures spring to upper jury brace universal.
- (7) At lower end of downlock spring assembly, remove spring retaining collar.
- (8) Unwind tool assembly until downlock spring extends to free length. Remove downlock spring assembly from tool assembly.
- R (9) Repeat Steps 3A(4) through 3A(8) to remove second downlock spring and associated parts.
- R (10) Remove two bolts that attach shuttle valve to actuator
R and two bolts that attach hydraulic manifold to
R actuator and remove shuttle valve/manifold assembly.
R Slide manifold out of shuttle valve. Cap all fittings.
- R NOTE: Shuttle valve and manifold are not locked
R together.
- R (11) Support shuttle valve to avoid excessive strain on
R hydraulic hoses.
- R (12) Remove upper actuator pin retaining sleeve.
- R (13) Remove upper actuator pin.
- R (14) Remove pin retaining collar from downlock spring pin.
- R (15) Remove downlock spring pin.
- R (16) Remove jury brace actuator.

B. Installation

- R (1) Ensure hydraulic system C pressure and system C
R reservoir pressure are 0 psi (Ref. 29-11-00).
- (2) Position rod end of jury brace actuator in slot provided in jury brace upper universal. Align self-aligning bearing in rod end with bushed holes in upper universal and insert upper actuator pin.
- (3) Install sleeve on pin and secure with bolt, washer, nut, and cotter pin.

EFFECTIVITY: ALL

32-32-02
Page 402
Jun 15/94



MAINTENANCE MANUAL

- (4) Coat outside surface of downlock spring pin with grease.
- (5) Position attachment lug at cylinder end of jury brace actuator between lugs on upper surface of lower side brace.
- (6) Align self-aligning bearing in cylinder with bushed holes in lugs and install downlock spring pin.
- (7) Center downlock spring pin in lugs, slide retaining collars on each end of pin and secure collars with bolts, washers, nuts, and cotter pins.
- R
R
R (8) Install preformed packings (o-rings) between backup rings on shuttle valve (one place) and on manifold (two places).
- R
R
R (9) Insert manifold into shuttle valve and attach assembly to actuator with two bolts through valve and two bolts through manifold.
- R
R (10) Torque bolts on shuttle valve and manifold and install lock-wire.

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

TRAVEL AREAS OF ALL FLIGHT CONTROL SURFACES AND MAIN GEAR DOORS ARE CLEAR OF PERSONNEL AND GROUND EQUIPMENT.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- R (11) Turn on hydraulic system C pressure (Ref. 29-11-00).
- R
R (12) Verify there is no leakage at jury brace actuator or connecting lines.
- R (13) Turn off hydraulic system C pressure (Ref. 29-11-00).

WARNING: WHEN COMPRESSED TO INSTALLED LENGTH, EACH DOWNLOCK SPRING EXERTS A FORCE OF APPROXIMATELY 150 POUNDS. EXERCISE EXTREME CARE DURING INSTALLATION TO PREVENT SPRING RELEASING FROM TOOL ASSEMBLY.

- R (14) Install downlock spring assembly in downlock spring tool assembly and compress until spring assembly fits

EFFECTIVITY: ALL

32-32-02
Page 403
Jun 15/94

LOCKHEED
MAINTENANCE MANUAL

between jury brace upper universal and lower side brace bushings.

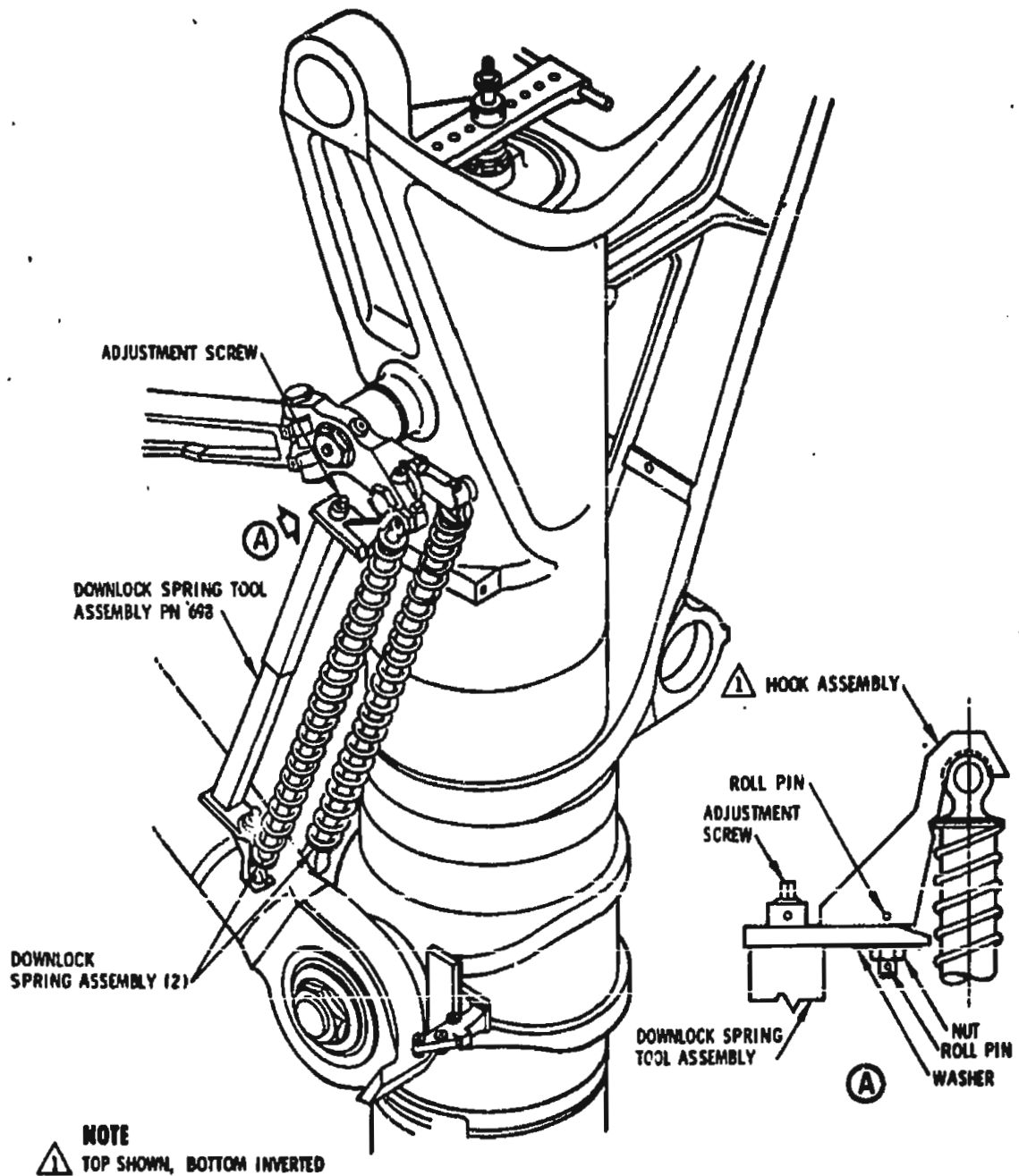
- R (15) Engage self-aligning bearings in lower end of downlock spring assembly with downlock spring pin.
- R (16) Secure assembly with collars, bolts, washers, nuts, and cotter pins.
- R (17) Align self-aligning bearing upper end of downlock spring assembly with bushed hole in jury brace universal and insert pin.
- R (18) Secure pin in place with bolt, washer, nut, and cotter pin.
- R (19) Remove tool assembly.
- R (20) Repeat Steps 3B(14) through 3B(19) to install second downlock spring and associated parts.
- R (21) Close MLG inboard door as required (Ref. 32-10-00).

EFFECTIVITY: ALL

32-32-02
Page 404
Jun 15/94

001B

LOCKHEED
MAINTENANCE MANUAL



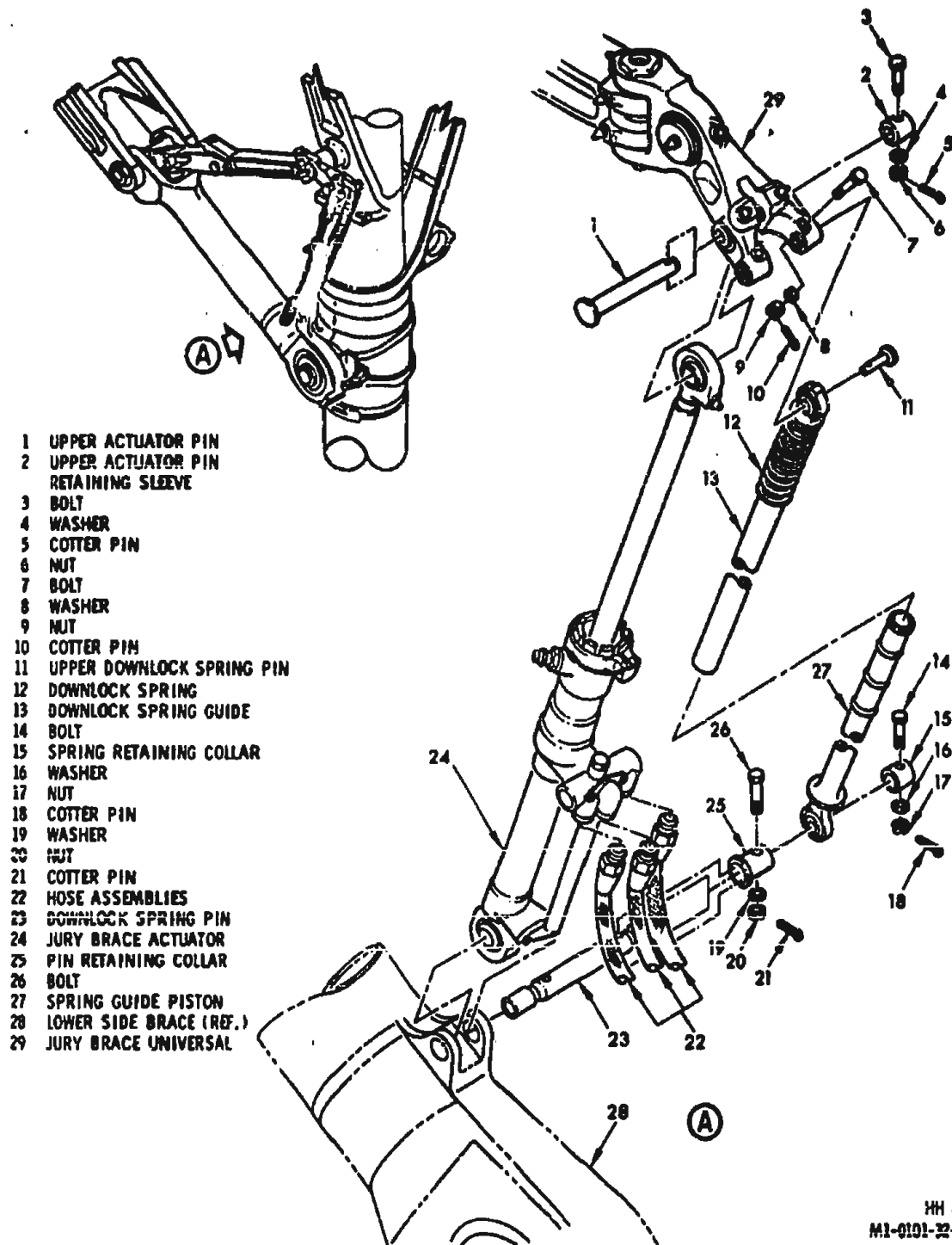
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Main Landing Gear Downlock Spring Assembly
Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-32-02
Page 405
Jun 15/94

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M1-0101-32-109

R Main Landing Gear Jury Brace Actuator - Removal and Installation
R Figure 402

R EFFECTIVITY: ALL
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32-32-02
Page 406
Jun 15/94

TRUCK POSITIONER - REMOVAL AND INSTALLATION1. Equipment and Materials

- R Grease, Ref. MM 12-20-00, Lubrication, Scheduled Sevicng
Cotter Pin, MS24665-153, or equivalent
Container (1-gallon, minimum)
Protective caps and plugs

2. Referenced Procedures

- 29-11-00 Hydraulic Power System - Maintenance Practices
32-31-16 Main Landing Gear Hydraulic Fuse - Maintenance Practices
32-61-08 Main Landing Gear Truck Unlevel Position Sensor - Adjustment and Test

3. Removal/Installation

A. Removal

- (1) Shut off hydraulic system C pressure (Ref. 29-11-00).
- (2) Position container under truck positioner control valve.
- (3) Disconnect hydraulic lines from truck positioner control valve (Ref. Fig. 401) and catch fluid in container.
- (4) Tag lines to ensure correct reinstallation.
- (5) Cap valve inlets and plug flex line fittings to prevent contamination and stop hydraulic fluid flow.
- (6) At positioner valve bleed fitting, bleed off any residual pressure.
- (7) Remove thru-bolts and flange washers from attach points.
- (8) Remove attach pins.

EFFECTIVITY: ALL

001B

32-32-03
Page 401
Dec 15/93

LOCKHEED
MAINTENANCE MANUAL

(9) Remove truck positioner.

B. Installation

- (1) Place positioner so that body end is aligned for attachment pin installation (grease fittings upward).
- (2) Coat attachment pin with grease and install attachment pin.
- (3) Align rod end of positioner with forward mounting lug.
- (4) Coat attachment pin with grease and install attachment pin.
- (5) Clean all dirt or grease from flange washer and mounting lug faces to ensure good electrical bond.
- (6) Install rear thru-grounding-bolt and flange washers.
- (7) Install forward thru-bolt and flange washers.
- (8) Install nuts on thru-bolts and safety with cotter pins.
- (9) Install flex lines to positioner valve fittings, ensuring that lines are not cross-connected.
- (10) Turn on hydraulic system C pressure (Ref. 29-11-00).
- (11) On aircraft 001-031 without SB29-065, bleed air from the truck positioner control valve at the bleeding fitting.
- (11) On aircraft 001-031 with SB29-065 and 032-999, set the hydraulic fuse located in the hydraulic service center to the bypass position before bleeding air from the truck positioner control valve bleed fitting. Reset and lock-wire hydraulic fuse when bleeding is completed (Ref. Fig. 402).
- (12) Lubricate forward and aft grease fittings.
- (13) If truck unlevel position sensors or targets have been disturbed, perform truck unlevel position sensor test (Ref. 32-61-08).

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4. Truck Positioner Control Valve - Removal/Installation

A. Removal

- (1) Shut off Hydraulic System C pressure (Ref. 29-11-00).

EFFECTIVITY: ALL

001B

32-32-03
Page 402
Aug 15/82



- (2) Position container under truck positioner control valve.
- (3) Disconnect hydraulic lines from truck positioner control valve (Ref. Fig. 401) and catch fluid.
- (4) Tag lines to ensure correct reinstallation.
- (5) Remove all seals and discard from hydraulic line connections.
- (6) Cap valve inlets and plug flexline fittings to prevent contamination.
- (7) At the truck positioner valve bleed fitting, bleed off any residual pressure.
- (8) Remove four bolts and remove the truck positioner control valve from the truck positioner.
- (9) Remove and discard the seals in the ports of the truck positioner.

NOTE: The above step must be accomplished each time the truck positioner control valve is separated from the truck positioner.

- (10) Plug the ports on the truck positioner to avoid contamination.

B. Installation

- (1) Unplug the ports on the truck positioner and inspect for contamination.
- (2) Install new seals in the ports of the truck positioner.

NOTE: The above step must be accomplished each time the truck positioner control valve is separated from the truck positioner.

- (3) Position the truck positioner control valve on the truck positioner and re-install four bolts and tighten.
- (4) Uncap the inlets and flexlines and connect to truck positioner control valve. Be sure that the hydraulic lines are not cross connected.
- (5) Turn on hydraulic system C pressure (Ref. 29-11-00).

LOCKHEED



MAINTENANCE MANUAL

- (6) On aircraft 001-031 without SB29-065,
bleed air from the truck positioner control valve at
the bleed fitting.
- (6) On aircraft 001-031 with SB29-065 and 032-999,
set the hydraulic fuse located in the hydraulic service
center to the bypass position before bleeding air from
the truck positioner control valve bleed fitting.
Reset and lock-wire hydraulic fuse when bleeding is
completed (Ref. Fig. 402).
- (7) If truck unlevel position sensors or targets have been
disturbed, perform truck unlevel position sensor test
(Ref. 32-61-08).

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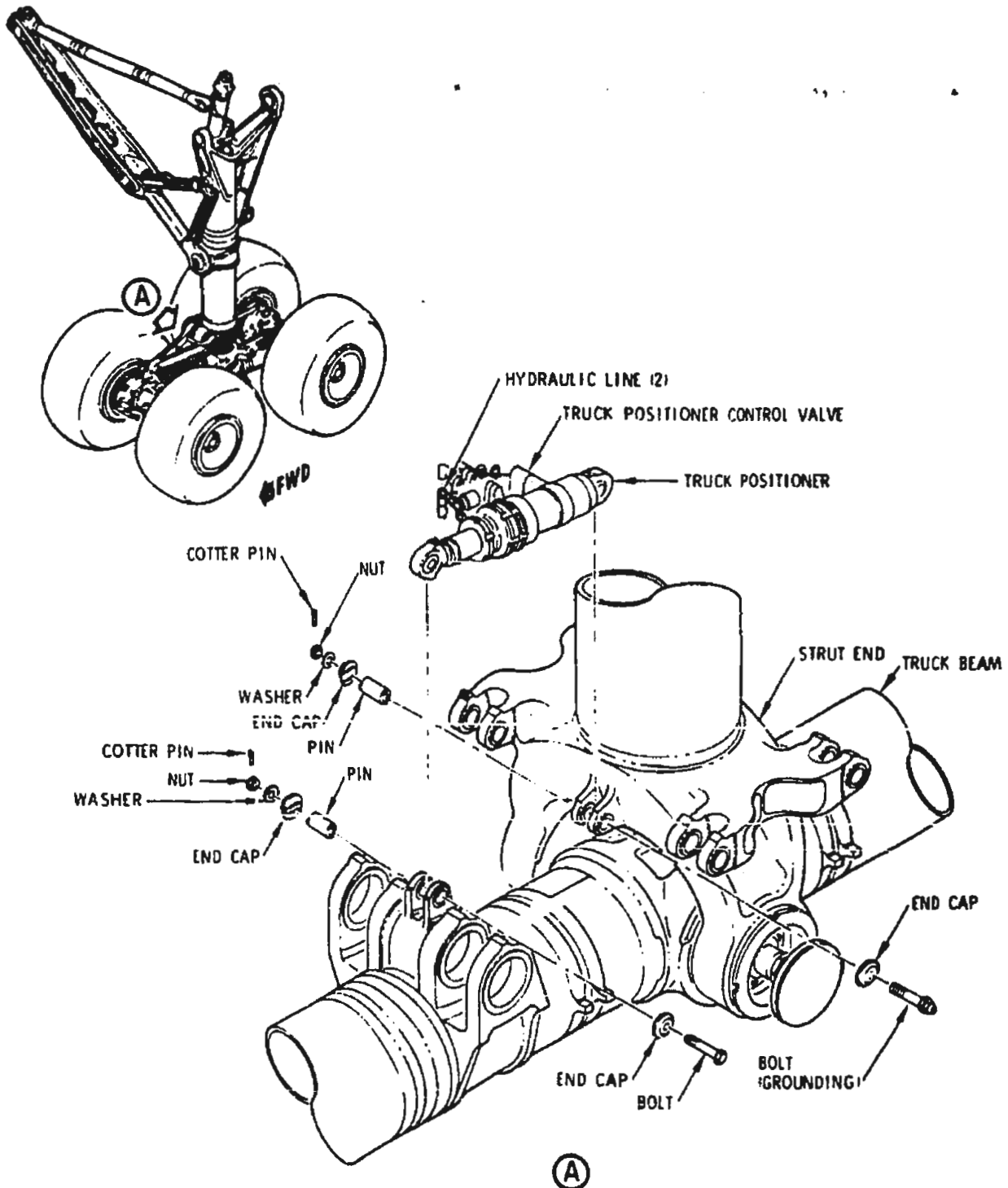
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32-32-03

Page 404
Aug 15/82

LOCKHEED
MAINTENANCE MANUAL



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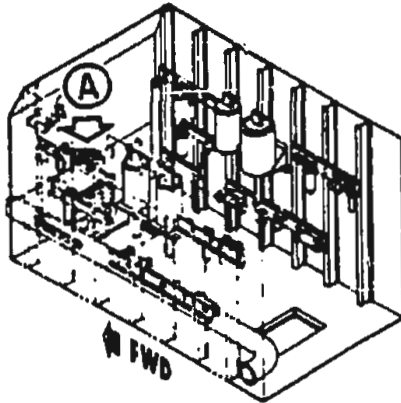
Truck Positioner - Removal and Installation
Figure 401

32-32-03
Page 405
Aug 15/81

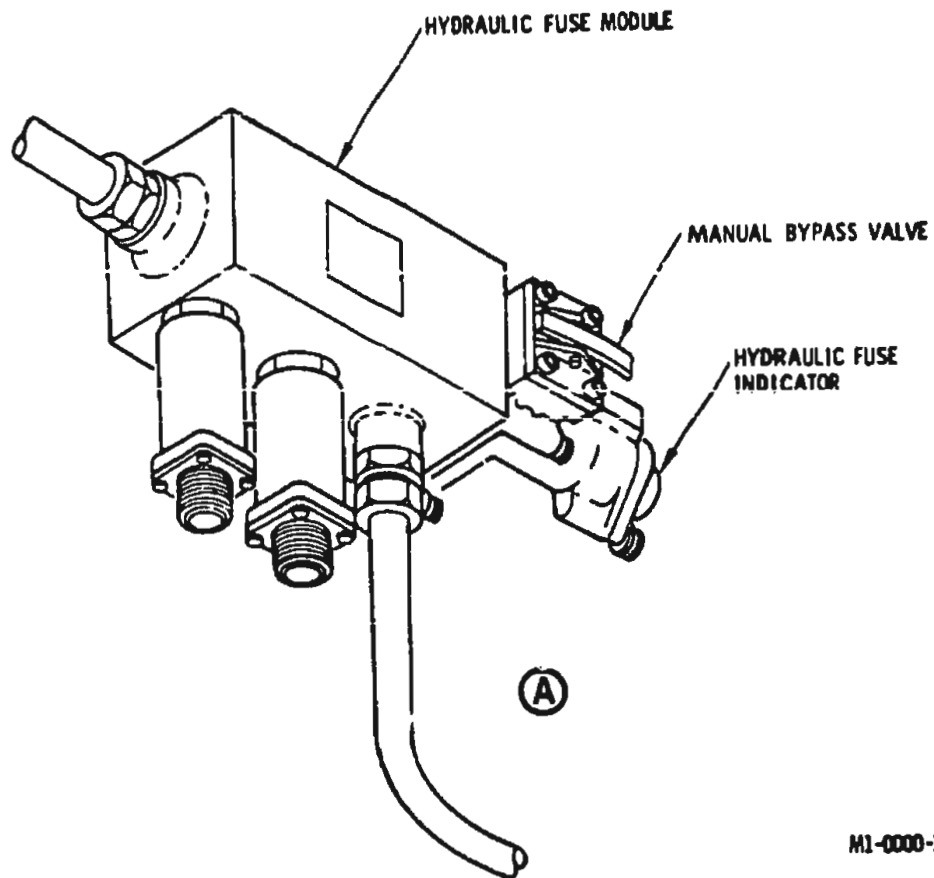
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EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL



HYDRAULIC SERVICE CENTER
ZONE 147



M1-0000-32-367

Main Landing Gear Hydraulic Fuse Module
Figure 402

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EFFECTIVITY: 001-031 WITH SB29-065 AND 032-999

32-32-03
Page 406
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL

TRUCK POSITIONER - INSPECTION AND CHECK

1. Equipment and Materials

Hydraulic fluid, LAC Spec C-34-1224, Type III or equivalent

2. Referenced Procedures

29-11-00 Hydraulic Power System - Maintenance Practices

29-11-00 Hydraulic Power System - Inspection and Check

3. Inspection/Check

A. Inspection

- (1) Verify that all safety wires and cotter pins are in place and clear of moving surfaces.
- (2) Wipe any dirt from exposed piston surfaces and inspect for scratches, impact marks, or cracks.
- (3) Check exposed thread distance from locknut to end of thread. Distance should be maximum of 0.625 inch. This ensures that piston is correctly secured to piston rod end with adequate thread engagement.

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NOTE: DO NOT ADJUST ROD END. Positioners are shop set in a pressurized condition to 15.85 ± 0.03 between centers of attach bearings and rod end jam nut torqued and locked. If dimension exceeded or jam nut loose replace positioner.

Wetting of the positioner (and truck), giving the appearance of a leaking unit, may be noted. This is caused by normal leakage from the piston vent port at the aft end of the unit and from the screen covered relief valve vent. This is acceptable, if there is no continuous leakage under static conditions when hydraulic system pressure is applied.

B. Check

- (1) Wipe entire positioner using clean cloths slightly dampened with hydraulic fluid.
- (2) Wipe positioner dry.

EFFECTIVITY: ALL

001B

32-32-03
Page 601
May 15/86



MAINTENANCE MANUAL

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (3) Turn on hydraulic system C pressure (Ref. 29-11-000 Maintenance Practices) and verify that LANDING GEAR control lever is in DOWN position.
- (4) Wait approximately 10 minutes and inspect piston glands, fluid vent ports, and valve parting surfaces for evidence of hydraulic fluid leakage. Refer to 29-11-00 Inspection and Check for allowable leakage rates. There must be no continuous leakage from the relief valve and piston vent ports.

NOTE: Normal leakage from the piston vent port may cause hydraulic fluid to wet the truck positioner thereby giving the appearance of a leaking unit. This leakage is acceptable and normal if there is no continuous leakage under static conditions with hydraulic pressure applied.

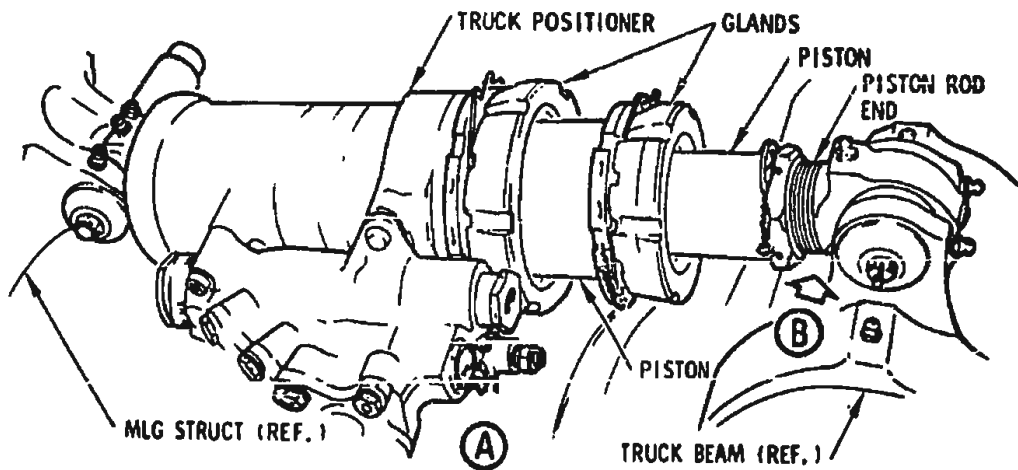
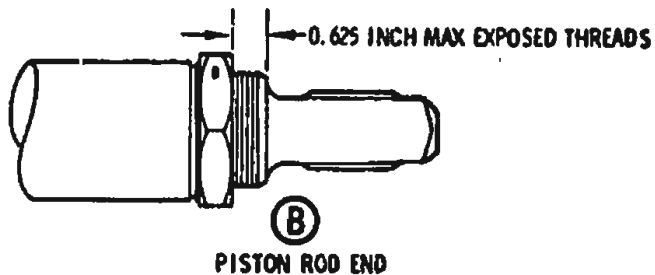
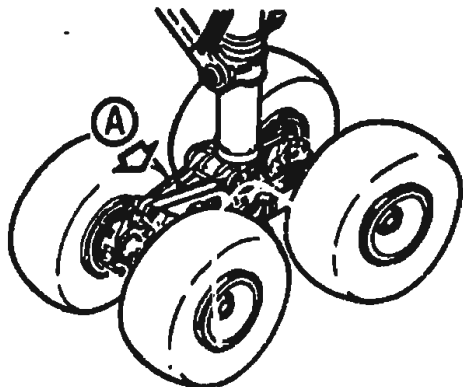
- (5) Turn off hydraulic system C pressure as required (Ref. 29-11-00 Maintenance Practices).

EFFECTIVITY: ALL

32-32-03
Page 602
Jun 15/92

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LOCKHEED
MAINTENANCE MANUAL



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Truck Positioner Inspection
Figure 601

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EFFECTIVITY: ALL

32-32-03
Page 603/604
May 15/86

LOCKHEED
MAINTENANCE MANUAL

R MLG RETRACTION ACTUATOR RELIEF VALVE -- REMOVAL AND INSTALLATION

R 1. General

R The main landing gear retraction actuator relief valve consists
R of an anodized aluminum body which contains a relief valve and a
R restrictor flapper check valve to control flow. The flapper
R check valve is used to permit unrestricted flow from the UP port
R to CYL 1, while restricting flow from the CYL 1 port to the UP
R port. Pressure buildup at CYL 1 port is relieved through the
R relief valve to the DOWN port (Ref. Fig. 401).

R 2. Equipment and Materials

R Bucket to catch fluid
R Protective caps and plugs
R Six foot platform ladder, or equivalent
R Lock-wire Fed Spec QQ-W-390, 0.032-inch diameter, or equivalent

R 3. Referenced Procedures

R 10-10-00 Towing - Maintenance Practices
R 12-13-01 Hydraulic Bootstrap Reservoir - Servicing
R 29-11-00 Hydraulic Power System - Maintenance Practices

R 4. Removal/Installation

R A. Removal

- R (1) Insure hydraulic system C pressure is 0 psi (Ref.
R 29-11-00).
- R (2) At upper end of retraction actuator bleed off any
R residual hydraulic pressure using bleed fitting (Ref.
R Fig. 401).
- R (3) Position container under relief valve to catch spilled
R fluid.
- R (4) Tag all hydraulic lines and fittings to assist during
R installation and disconnect three hydraulic lines.

R EFFECTIVITY: ALL
R
001B

32-32-04
Page 401
Nov 15/78



MAINTENANCE MANUAL

- (5) Install plugs and caps on hydraulic lines and fittings to prevent contamination.
- (6) Unsafety and remove four bolts and washers holding relief valve to the actuator body.
- (7) Remove retraction actuator relief valve.

B. Installation

- (1) Install retraction actuator relief valve with the UP and DOWN hydraulic ports in the up position (Ref. Fig. 401) using four bolts and washers and safety with lock-wire.
- (2) Connect three hydraulic lines and fittings using attached tags to insure proper location.
- (3) Install left and right MLG and NLG downlock safety pins (Ref. 10-10-00).

R WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM.

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

TRAVEL AREAS OF ALL FLIGHT CONTROL SURFACES AND MAIN GEAR DOORS ARE CLEAR OF PERSONNEL AND GROUND EQUIPMENT.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (4) Turn on hydraulic system C pressure (Ref. 29-11-00).
- (5) Position landing gear control switch in the NEUTRAL position.

NOTE: Placing landing gear control switch in NEUTRAL puts low hydraulic pressure to both sides of the retraction actuator to facilitate bleeding the relief valve.

- (6) Crack open carefully the hydraulic lines and fittings at the relief valve to allow bleeding air from the system and tighten.
- (7) Safety the CYL 2 fitting with lock-wire.

EFFECTIVITY: ALL

001B

32-32-04
Page 402
Aug 15/81

LOCKHEED



MAINTENANCE MANUAL

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CAUTION: FAILURE TO REPOSITION THE LANDING GEAR CONTROL SWITCH IN THE DOWN POSITION LEAVES THE GEAR SWITCH WITHOUT A SAFETY.

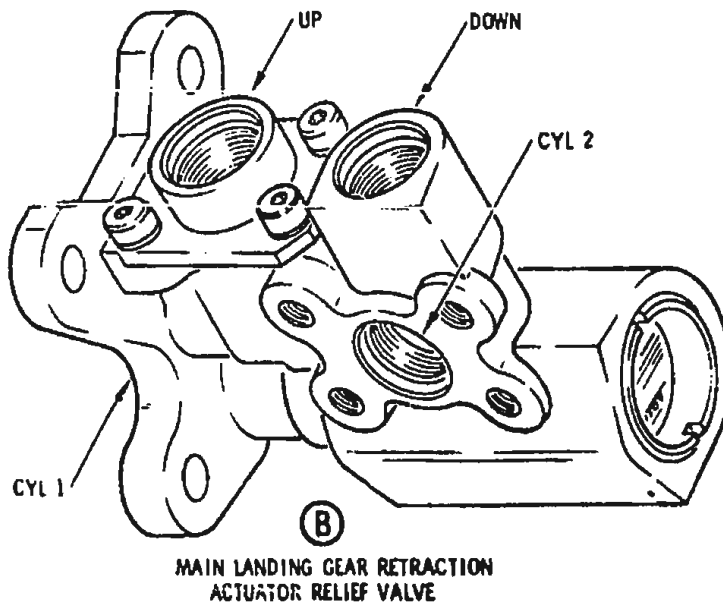
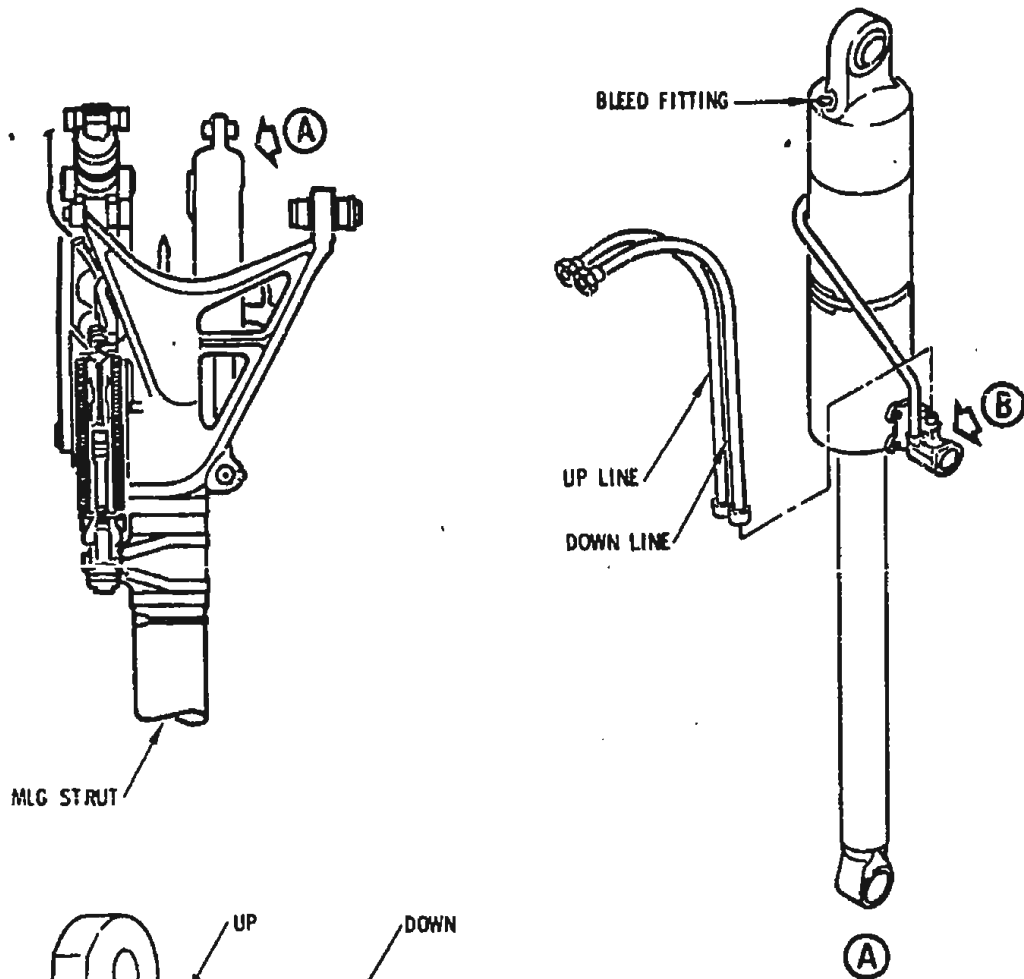
- (8) Position landing gear control switch in the DOWN position.
- (9) Observe the retraction actuator relief valve for leakage.
- (10) Turn off hydraulic system C pressure (Ref. 29-11-00).

EFFECTIVITY: ALL

001B

32-32-04
Page 403
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



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MLG Retraction Actuator Relief Valve - Removal and Installation
Figure 401

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EFFECTIVITY: ALL

32-32-04
Page 404
Aug 15/81

MAIN LANDING GEAR DOOR ACTUATION - DESCRIPTION AND OPERATION1. General

The left and right main landing gear (MLG) fixed and hinged doors are mechanically operated by gear action. Each left and right inboard door is hydraulically actuated and controlled by a subsystem that consists of the following components:

An inboard door actuator assembly

An inboard door link

A rod assembly

A phase control valve

A phase control valve control linkage

A manually-operated ground control valve

R The MLG inboard doors can also be operated from the ground
R manually using D-handle controls located in the fairing, forward
R of the doors, at FS 1163 and BL 47.84 R and L.

2. Main Landing Gear Inboard Door Actuator Assembly

A. Description

The MLG inboard door actuator assembly comprises a main actuator to open and close the door, and a lock actuator that moves mechanical cams through an over-center locking linkage to lock and unlock the door.

B. Operation

The MLG inboard door is opened by simultaneously applying hydraulic pressure to the open port of the lock actuator and to the cylinder end of the main actuator. When the lock actuator piston retracts, the over-center lock mechanism swings the locking cams up and away from the pin end assembly that attaches the main actuator to the MLG door. This action allows the main actuator piston to extend and open the door. The door is closed by simultaneously applying hydraulic pressure to the rod end port of the main actuator and to the close port of the lock actuator. The door closes when the main actuator piston retracts. When the main actuator piston is nearly retracted, the rollers on the rod end pin contact the locking cams and force the

EFFECTIVITY: ALL

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32-33-00

Page 1

Jan 15/73



linkage out of the locked position. This action allows the lock actuator piston to extend, which forces the linkage to swing the locking cams over the rod end pin assembly to form a positive mechanical lock. If application of hydraulic pressure to the open port of the lock actuator subassembly fails to unlock the door, hydraulic pressure can be applied to the alternate open port on the lock actuator which in turn applies pressure on the alternate piston. The alternate piston unlocks the locking cams.

3. Inboard Door Link and MLG Door Rod

A. Description

The inboard door link is a triangular forged and machined aluminum alloy beam installed between the inboard door actuator and the MLG door rod assembly. The MLG door rod assembly comprises an inner and outer rod held rigidly extended by 14 Belleville springs.

B. Operation

The inboard door link and door rod transmit the forces applied through the door actuator to the inboard door for opening and closing operations. The inboard door link also functions as the MLG uplock. The Belleville springs hold the door tightly closed, yet allow some structural flexing of the door.

4. Main Landing Gear Phase Control Valve Module

A. Description and Operation

The left and right MLG phase control valve modules are used to control the respective MLG retract actuator and inboard door actuator. The valve modules function to prevent collision between the inboard doors and the main landing gears when in transit up and down.

The valve module (Ref. Fig. 1) consists of three individual control valves housed in a common manifold package. The three valves are a door sequence valve, a landing gear sequence valve, and a bypass valve. Also inserted in the valve module housing are two cartridge-type valves: a runaround valve and a priority valve.

Each door sequence (door input) and landing gear sequence (gear input) valve is connected to a respective left or right inboard door and landing gear by bellcranks and sheathed flexible controls (Ref. Fig 2). Figure 3



MAINTENANCE MANUAL

illustrates valve positions during gear and door movement from down and locked to up and locked.

(1) Door Sequence Valve (Door Input)

The door sequence valve is a direct-acting two-way, two-position valve with a control shaft for push-pull stroking. The valve receives its actuating signal from the landing gear door through mechanical linkage. Hence, the valve spool controls fluid flow in relation to door position.

(2) Landing Gear Sequence Valve (Gear Input)

The landing gear sequence valve is a direct-acting, six-way, two-position valve with a control shaft for push-pull stroking. The valve receives actuating signals from the MLG strut position through mechanical linkage. Movement of the linkage results in movement of the valve spool, hence control of fluid flow in relation to landing gear strut position.

(3) Bypass Valve

The bypass valve is a two-way, three-position valve. The valve, which is used only during mechanical alternate operation or hydraulic alternate operation to bypass fluid flow, is opened either by cable actuation or by hydraulic pressure supplied from an accumulator. The normally closed valve is held closed by a spring. A device in the valve maintains tension in the cable actuation rigging when bypass valve actuation is accomplished hydraulically.

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(4) Differential Priority Valve

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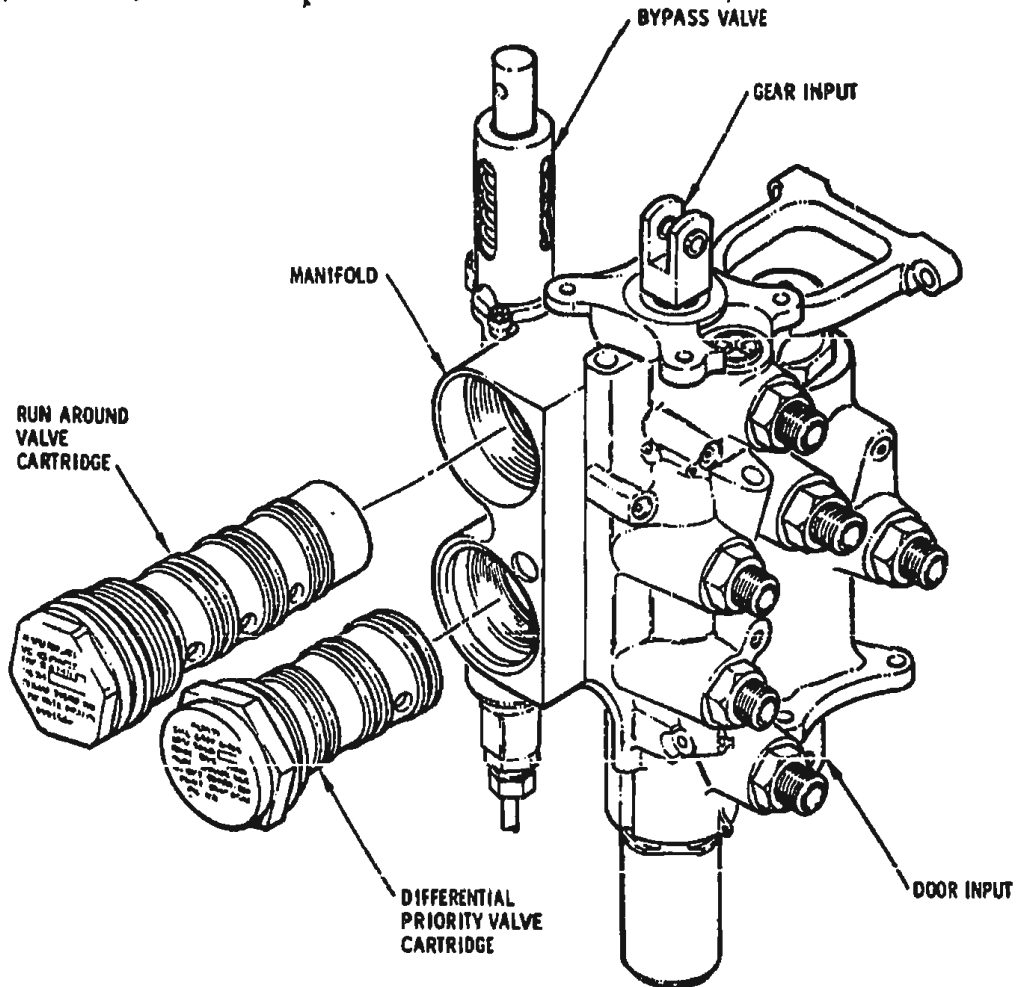
The differential priority valve (Ref. Fig. 8) is mounted in the phase control valve (Ref. 32-33-00) located in each main landing gear wheel well. The valve consists of a spring loaded poppet valve incorporating a spring loaded check valve to provide a differential pressure balancing function. The differential priority valve functions to delay the main landing gear inboard door closing until the main landing gear actuator has developed more differential pressure than is required to support the gear. This will move the gear against the upstop before permitting the door to close.

EFFECTIVITY: ALL

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32-33-00
Page 3
Dec 15/93

LOCKHEED
MAINTENANCE MANUAL



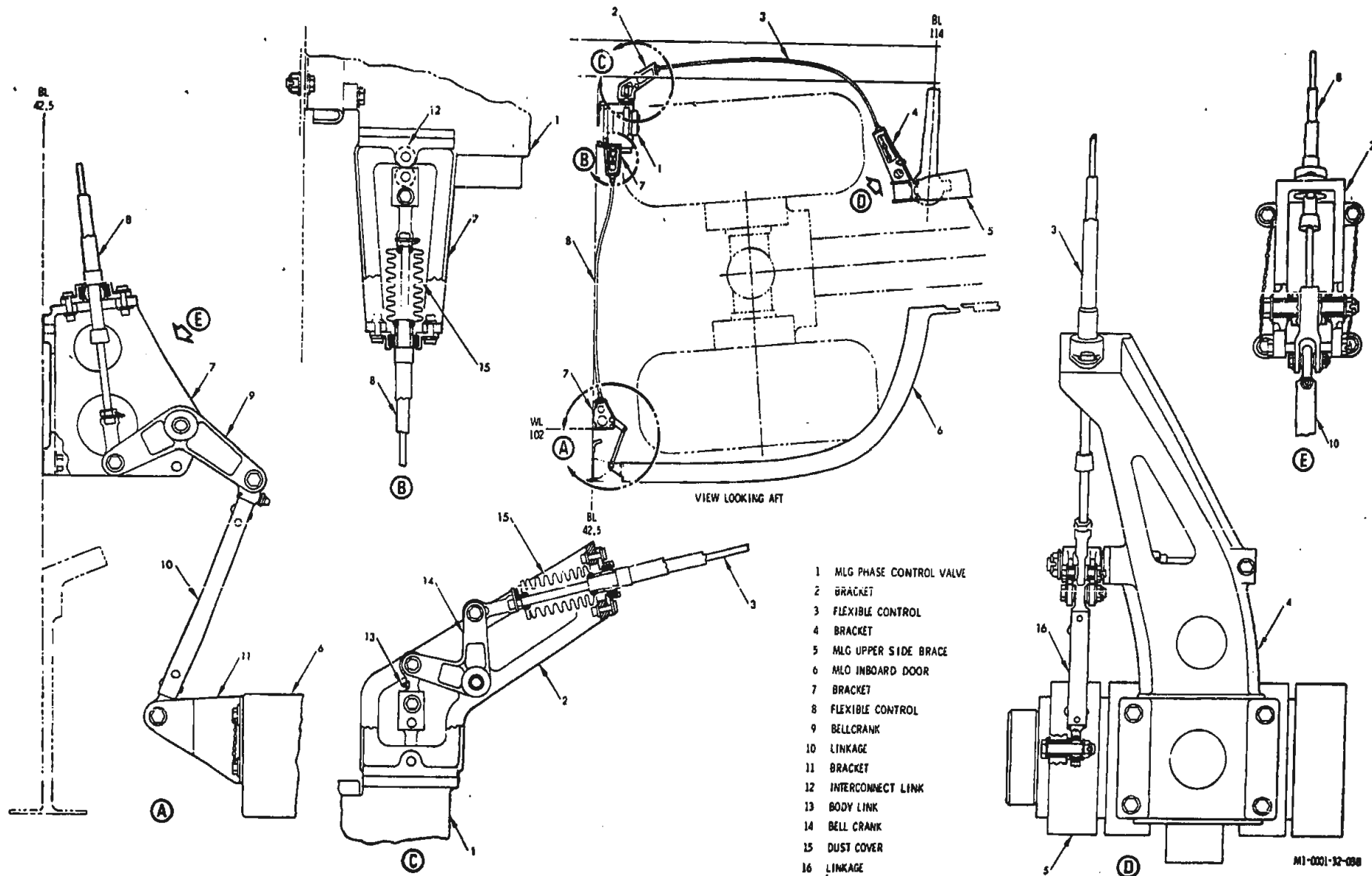
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Phase Control Valve Module
Figure 1

EFFECTIVITY: ALL

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32-33-00
Page 4
Dec 1/71



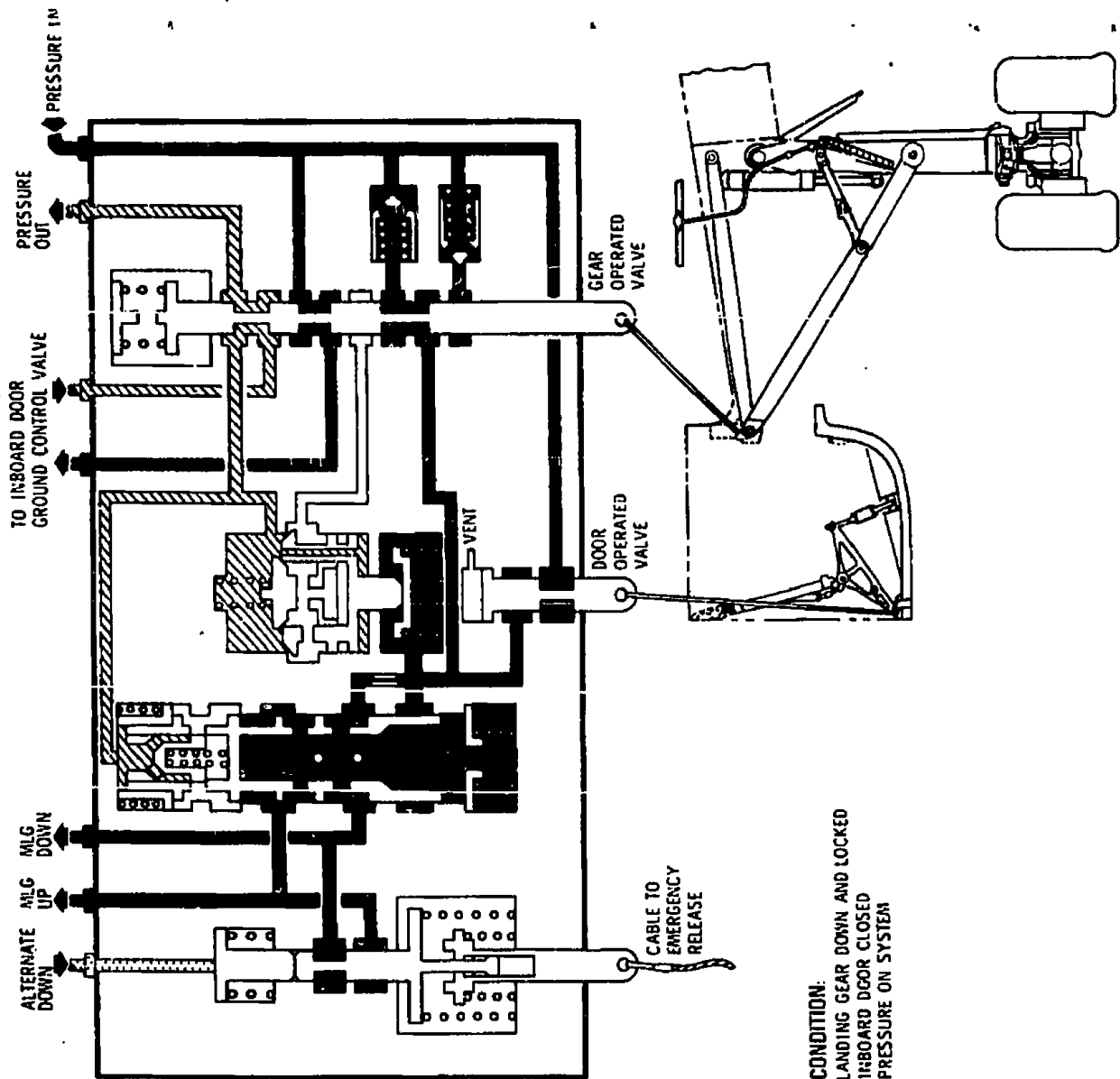
Phase Control Valve Control Linkage
Figure 2

EFFECTIVITY: ALL

32-33-00
Page 5/6
Mar 15/83

LOCKHEED
MAINTENANCE MANUAL

HH 4808
M1-0101-32-043



Main Landing Gear Phase Control
Figure 3 (Sheet 1)

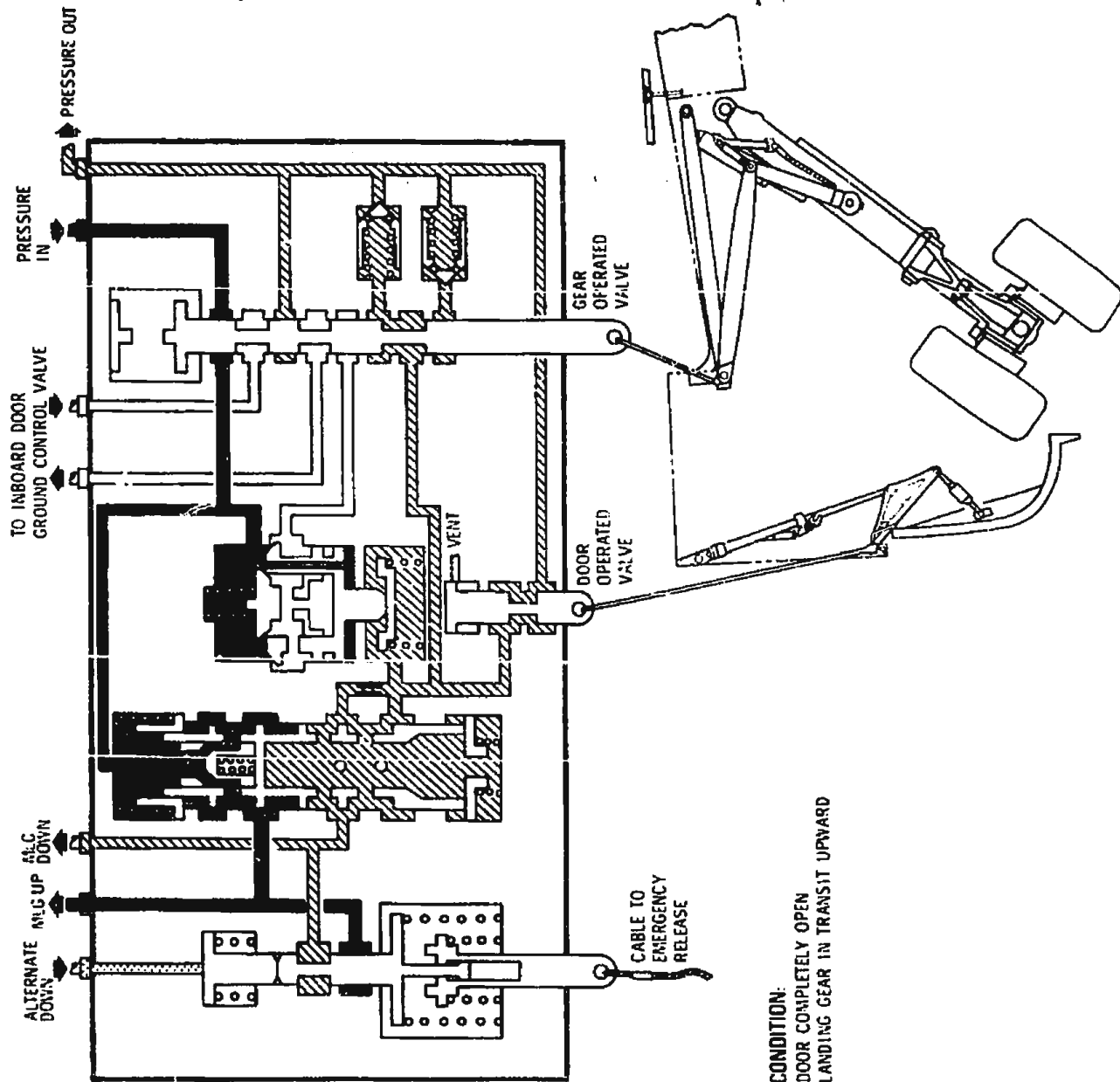
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32-33-00
Page 7
Dec 1/71

LOCKHEED
MAINTENANCE MANUAL

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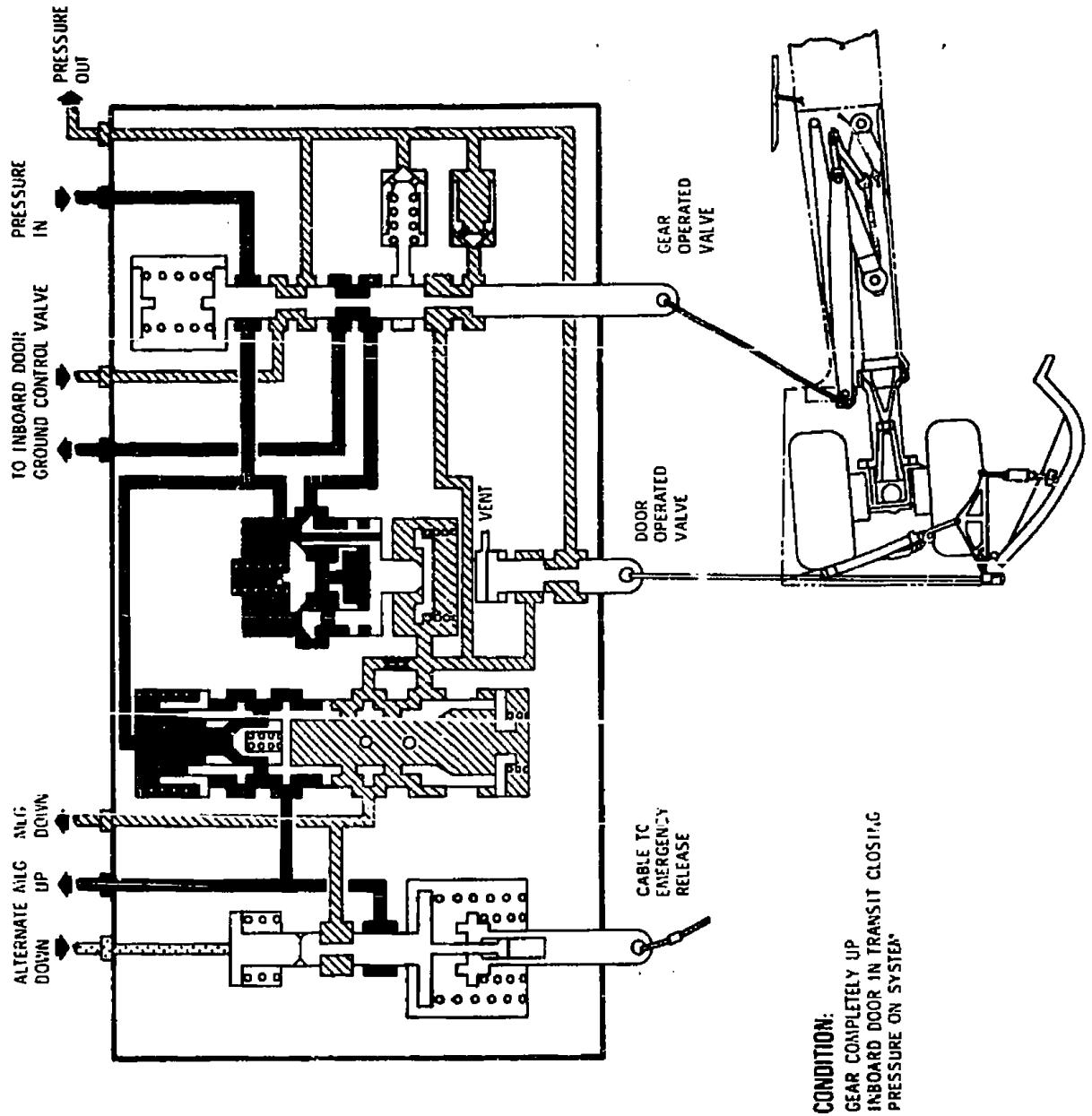
Main Landing Gear Phase Control
Figure 3 (Sheet 2)

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32-33-00
Page 8
Dec 1/71

LOCKHEED
MAINTENANCE MANUAL

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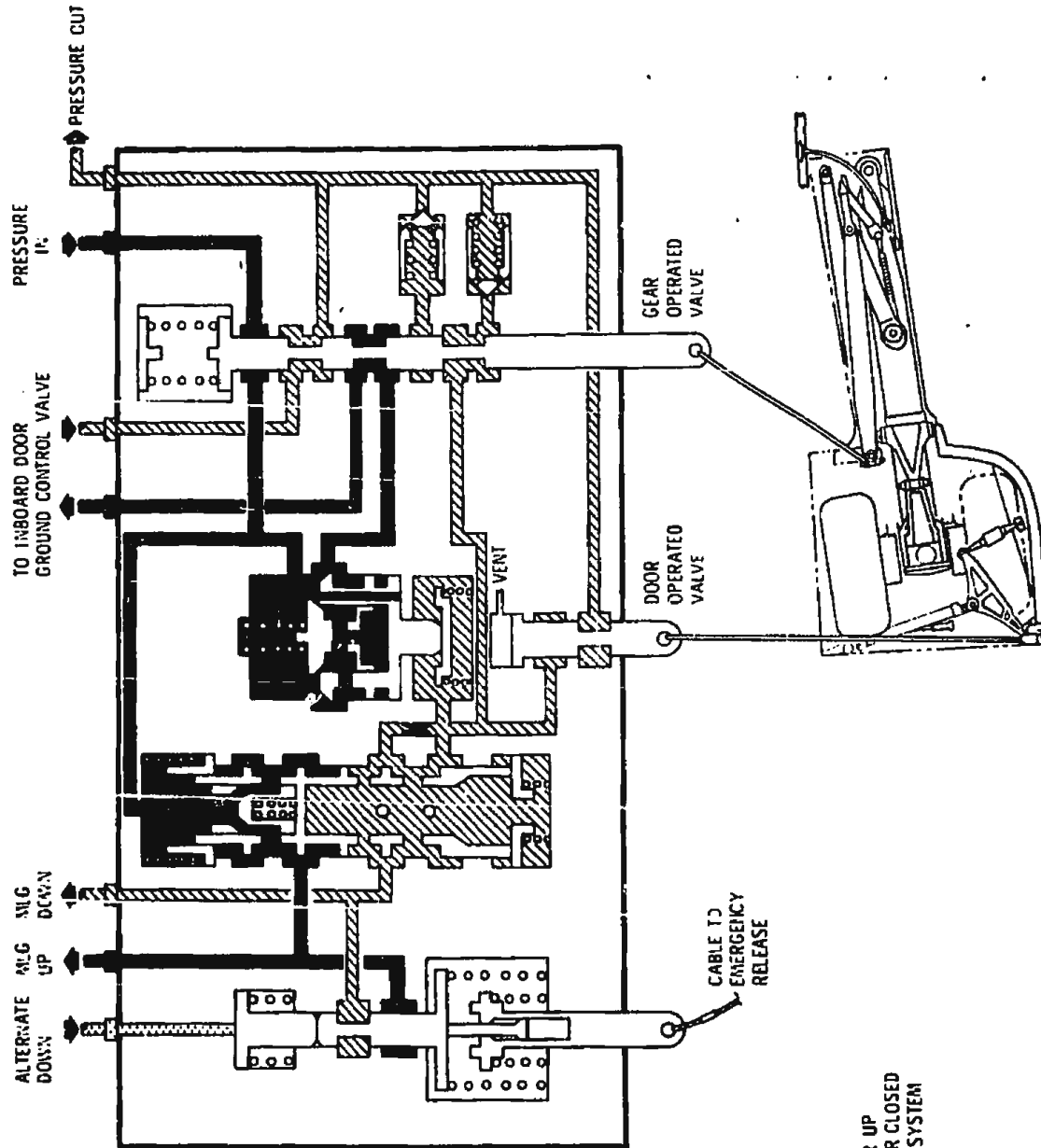
Main Landing Gear Phase Control
Figure 3 (Sheet 3)

EFFECTIVITY: ALL

32-33-00
Page 9
Dec 1/71

LOCKHEED
MAINTENANCE MANUAL

HH 4859
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CONDITION:
 LANDING GEAR UP
 INBOARD DOOR CLOSED
 PRESSURE ON SYSTEM

**Main Landing Gear Phase Control
 Figure 3 (Sheet 4)**

EFFECTIVITY: ALL

32-33-00
 Page 10
 Dec 1/71



5. Hydraulic Pressure-controlled Check Valve

A. Description

The pressure-controlled hydraulic check valve consists of a cast-aluminum anodized body containing a thermal expansion relief valve, a pressure relief valve, a controllable check valve, a restrictor check valve, and a check valve. The valve works in the landing gear extension and retraction system to prevent collisions between the MLG inboard door and the MLG when the MLG is in transit from the down-and-locked position to the up-and-locked position, or vice versa. During a momentary gust the door may start to close before the gear is fully up, but the pressure-controlled check valve acts as a ratchet to keep the door moving to the open position. A valve is mounted on the left and right MLG inboard door actuators zones 145 and 146.

B. Operation

The controllable check valve is spring-loaded to the closed position. When pressure is applied to port P1, the check valve is moved to the open position. The open check valve allows flow, through the orifice in the restrictor check valve poppet, and out port P3. With pressure applied to port P3, fluid cannot flow to port P1 until pressure is applied to port P4. Pressure applied to port P4 acts on the plunger; the pressure overcomes the reference spring and the check mechanism to allow flow from port P3 to port P1.

6. Main Landing Gear Inboard Door Manual Ground Control

A. Description

The manual ground control system provides a means to open either or both of the inboard doors for maintenance purposes without actuating the landing gear retraction and extension system. The manual ground control system consists of the following components:

Two spool type ground control valves located on each side of the hydraulic service center, zone 147, FS 1272 right side and FS 1287 left side (Ref. Fig. 6)

Associated cables and linkage connecting D-handles to MLG inboard door actuator uplock assembly (Ref. Fig. 7)

B. Operation

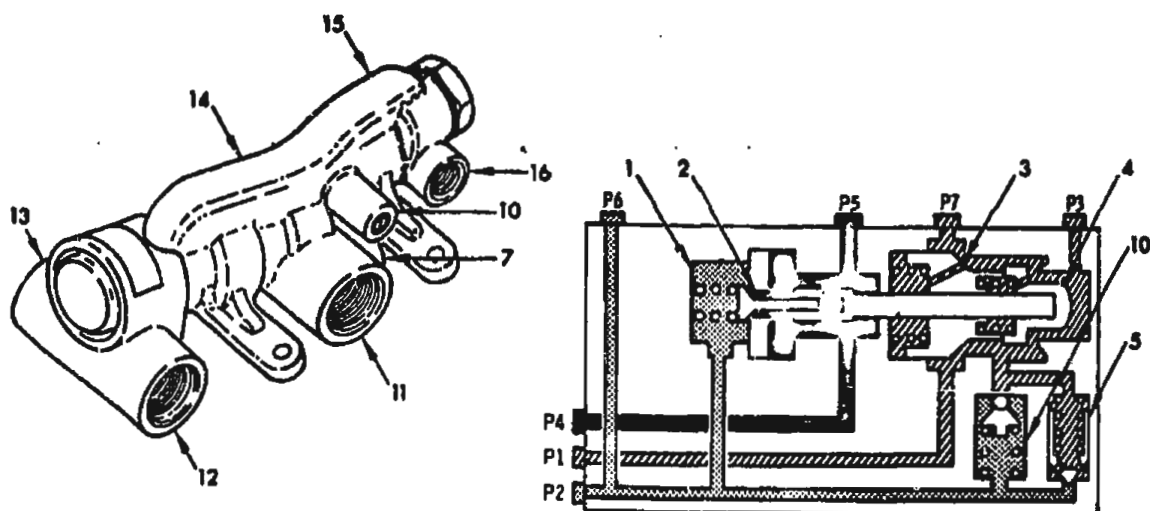
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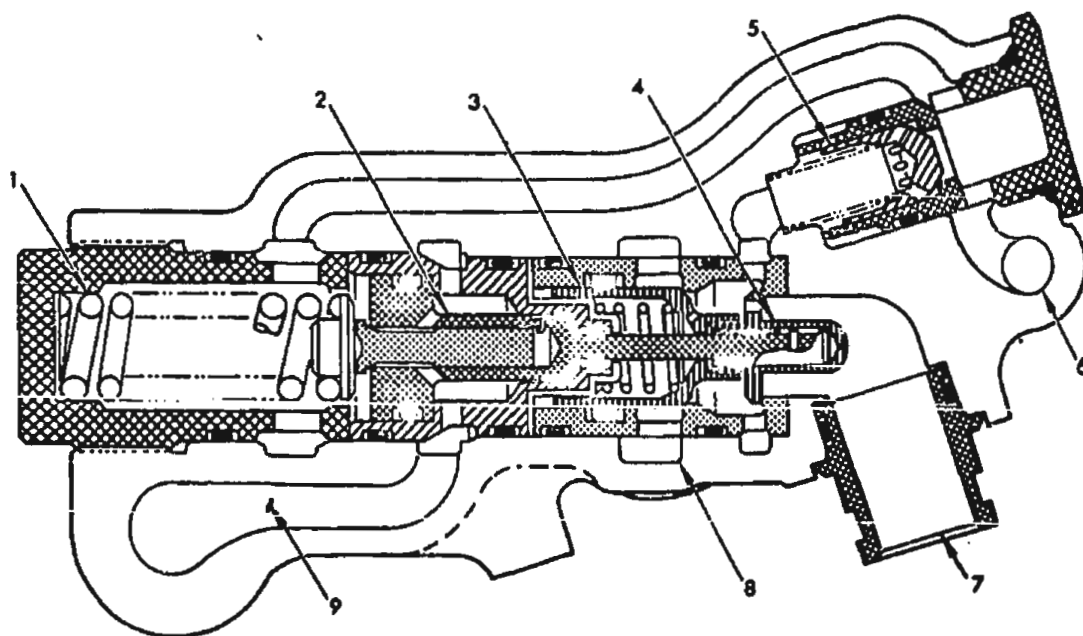
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Page 11
Dec 15/93

LOCKHEED
MAINTENANCE MANUAL



FLOW SCHEMATIC



- | | |
|-----------------------------|---------------------------|
| 1 REFERENCE SPRING | 9 P4 AND P5 PRESSURE FLOW |
| 2 POPPET | 10 THERMAL RELIEF VALVE |
| 3 CONTROLLABLE CHECK POPPET | 11 P1 PORT |
| 4 RESTRICTOR POPPET | 12 P5 PORT |
| 5 CHECK VALVE | 13 P4 PORT |
| 6 P2 AND P6 PRESSURE FLOW | 14 P7 PORT |
| 7 P3 PORT | 15 P6 PORT |
| 8 P1 AND P7 PRESSURE FLOW | 16 P2 PORT |

- | | |
|---|-------------------------|
|  | DOOR CLOSE PRESSURE |
|  | DOOR OPEN PRESSURE |
|  | ALTERNATE DOWN PRESSURE |

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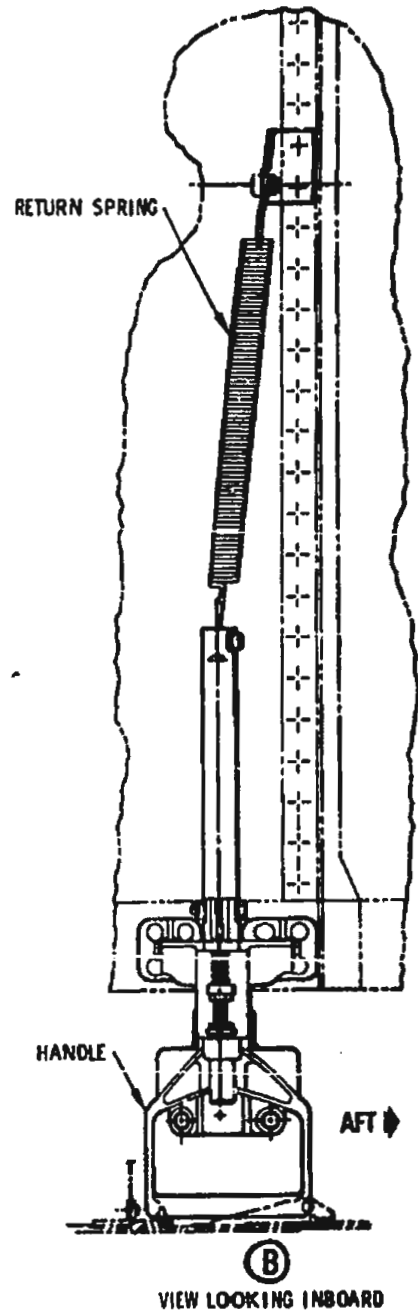
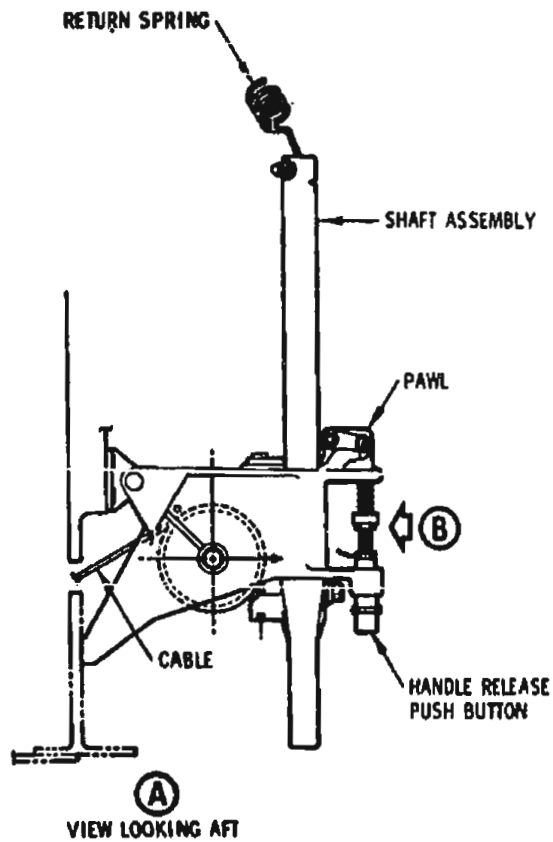
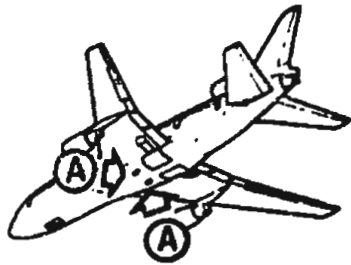
Hydraulic Pressure-controlled Check Valve
Figure 4

EFFECTIVITY: ALL

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32-33-00
Page 12
Dec 1/71

LOCKHEED
MAINTENANCE MANUAL



MA 2000
ML-0100-32-310

Two-position D-handle
Figure 5

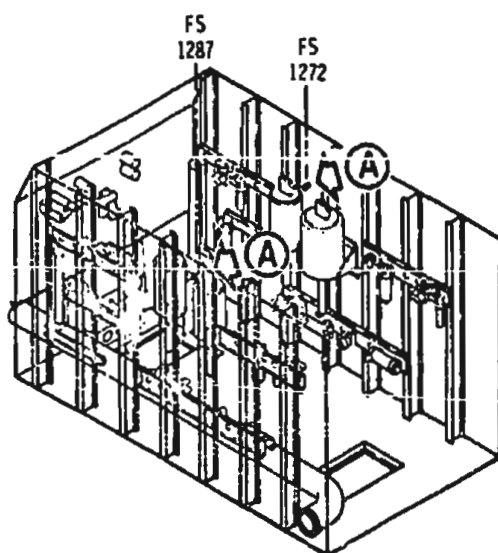
R EFFECTIVITY: ALL
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32-33-00
Page 13
Sep 15/79

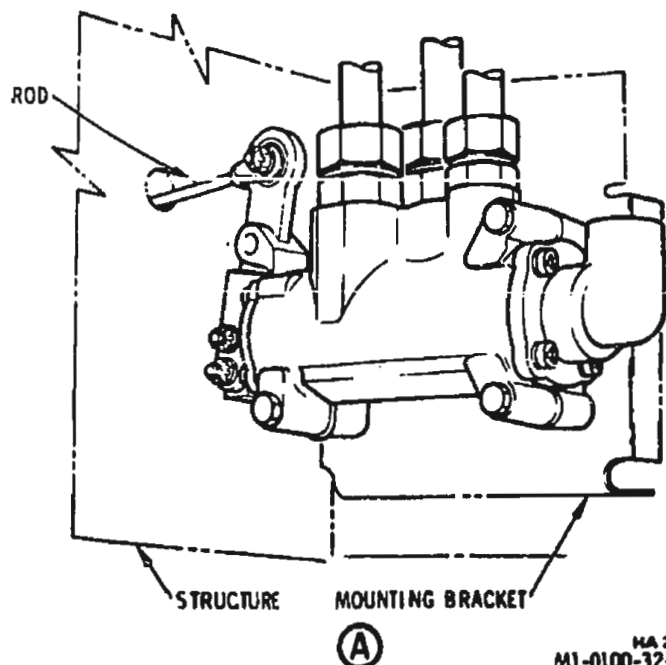


The MLG inboard door is opened by pulling the manual ground control D-handle fully down against the stop (Ref. Fig. 7). The D-handle, through cables and linkage, actuates the MLG inboard door ground control valve (Ref. Fig. 8). Hydraulic fluid is routed from the bottom side of the door and uplock actuator to the top side, thereby allowing the actuator to move when acted on by external forces. The MLG uplock assembly is actuated to the unlocked position when the D-handle is pulled because hydraulic fluid on the top of the piston is free to flow through the controllable check valve and ground control valve to the bottom side of the uplock actuator piston. Weight of the MLG inboard door extends the MLG inboard door actuator because the hydraulic fluid on the bottom of the piston is allowed to flow through the controllable check valve and ground control valve to the top of the MLG inboard door actuator.

The MLG door is closed when hydraulic system C is pressurized, the D-handle is positioned fully upward against the stop, and the landing gear control lever is in the DOWN position. The ground control valve is returned to its normal position routing hydraulic system C pressure through the controllable check valve to the bottom of the door actuator piston. The ground control valve also routes hydraulic fluid flow from the top of the door actuator piston, through the controllable check valve and ground



ZONE 147
HYDRAULIC SERVICE CENTER



MA 2582
M1-0100-32-311

Manual Ground Control Valve
Figure 6

R EFFECTIVITY: ALL
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32-33-00
Page 14
Dec 15/93

LOCKHEED



MAINTENANCE MANUAL

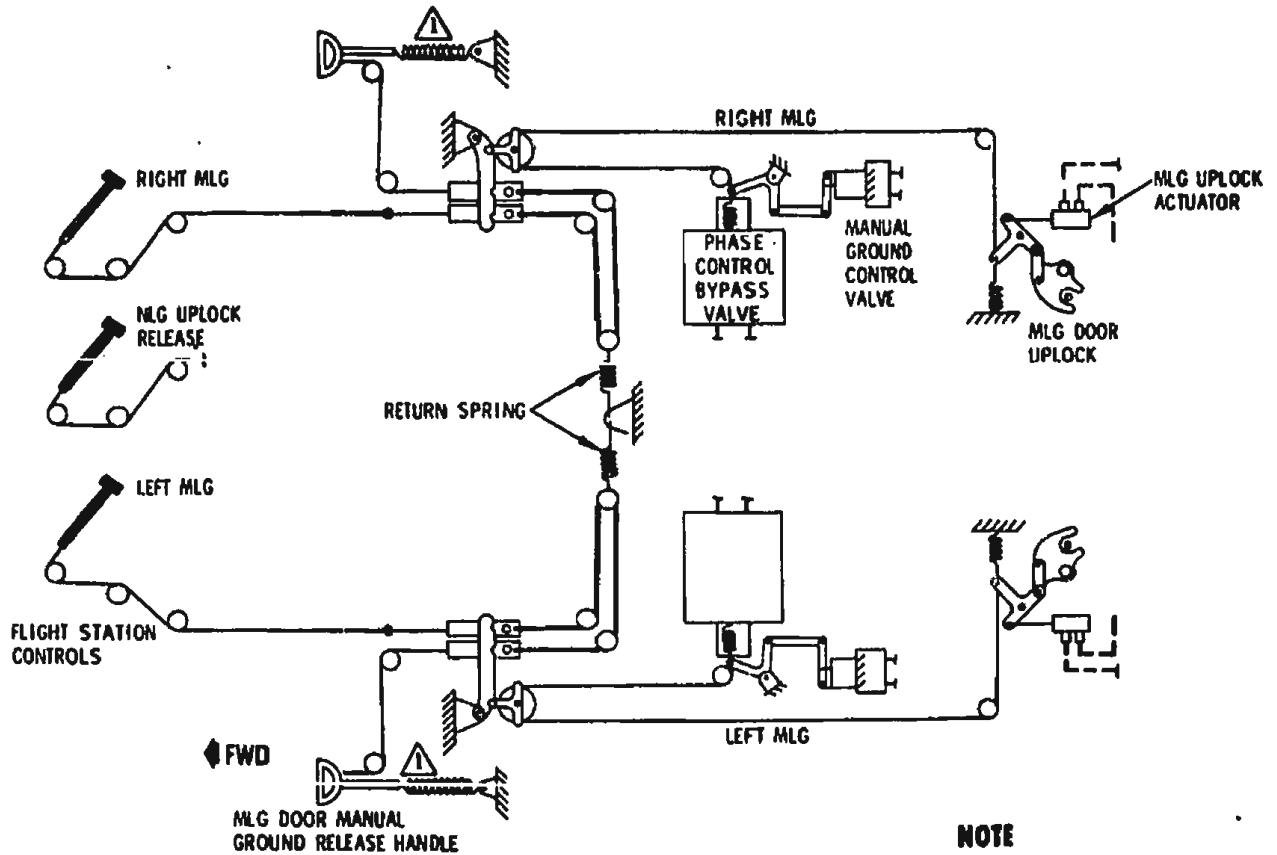
control valve, to hydraulic system return. As the door actuator piston reaches the top of its travel, uplock rollers on the piston engage the uplock assembly. The uplock assembly linkage is moved to an over center position. This action allows the uplock actuator to extend because the ground control valve has routed hydraulic system C pressure to the top of the piston. Extending the uplock actuator forces the uplock linkage to swing the locking cams over the rod end uplock rollers to form a positive mechanical lock.

R EFFECTIVITY: ALL
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32-33-00

Page 15
Dec 15/93

LOCKHEED
MAINTENANCE MANUAL



NOTE

 **SPRING NOT INSTALLED IN MULTIPOSITION D-HANDLE INSTALLATION**

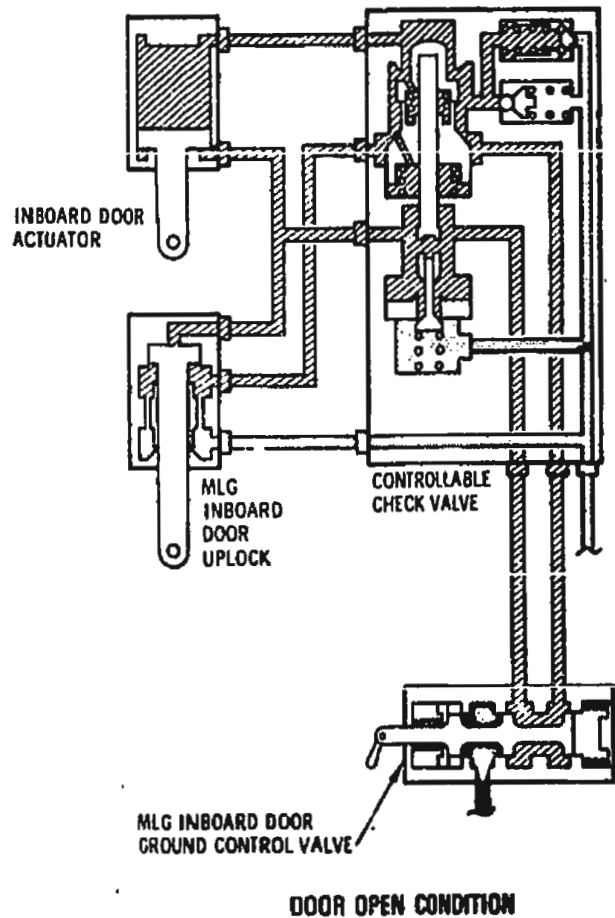
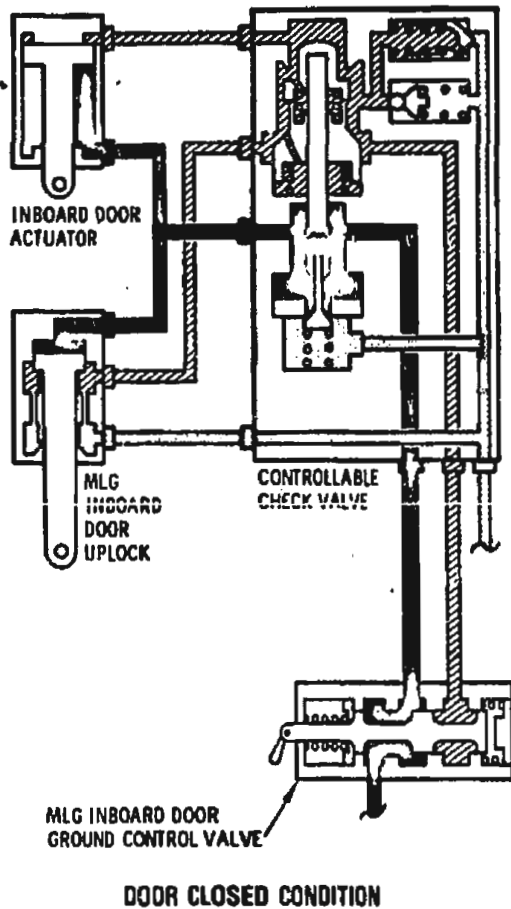
HA 2531
MI-0100-32-312

Manual Ground Control Linkage
Figure 7

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001B EFFECTIVITY: ALL

32-33-00
Page 16
Dec 15/93

LOCKHEED
MAINTENANCE MANUAL



	SYSTEM PRESSURE
	SYSTEM RETURN
	ALTERNATE DOWN PRESSURE (REF.)

MI-1801-32-313

**Manual Ground Control Hydraulic Schematic
Figure 8**

R EFFECTIVITY: ALL
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32-33-00
Page 17/18
Dec 15/93

CR MAIN LANDING GEAR DOOR MANUAL RELEASE SYSTEM - TROUBLE SHOOTINGCR 1. Trouble Shooting

CR A. Determine if we are bottoming out the "MLG Inboard Door
CR Manual Ground Control Valve" with operation of "Door Release
CR Handle" by the following procedure (Ref. Fig. 101):

CR (1) Disconnect Manual Ground Control Valve "Adjustable
CR Link" at point "A" in Figure 101. Point "A" located in
CR wheel well.

CR (2) Pull "Door Release Handle" through its full stroke.

CR (3) Manually pull disconnected "Adjustable Link" until
CR Manual Ground Control Valve bottoms out (approximate
CR operating load 8 lbs). With valve bottomed out,
CR determine if system will bottom out on "Door Manual
CR Ground Control Valve." If mating holes at point "A"
CR cannot be pulled into or past alignment, system bottoms
CR out on this valve.

CR (4) If system bottoms out valve, the valve is faulty and
CR must be replaced and you may go to Step F. If system
CR does not bottom out "Door Manual Ground Control Valve",
CR proceed with Step B.

CR B. With Point "A" disconnected and "Door Release Handle" in
CR operated position, determine if system is bottomed out on
CR "Phase Control Bypass Valve Cartridge" or on "Door Release
CR Handle." This can be done by scaling the distance between
CR the shoulder on the "Phase Control Bypass Valve Cartridge"
CR cable operated plunger and the stop for the shoulder while
CR deflecting the cable in the Hydraulic Service Center which
CR strokes the valve. Valve shoulder movement while deflecting
CR cable, indicates system bottoming out on "Door Release
CR Handle." Proceed with Step C if this is the case. If system
CR is bottoming out on the "Phase Control Bypass Valve
CR Cartridge" proceed with Step D.

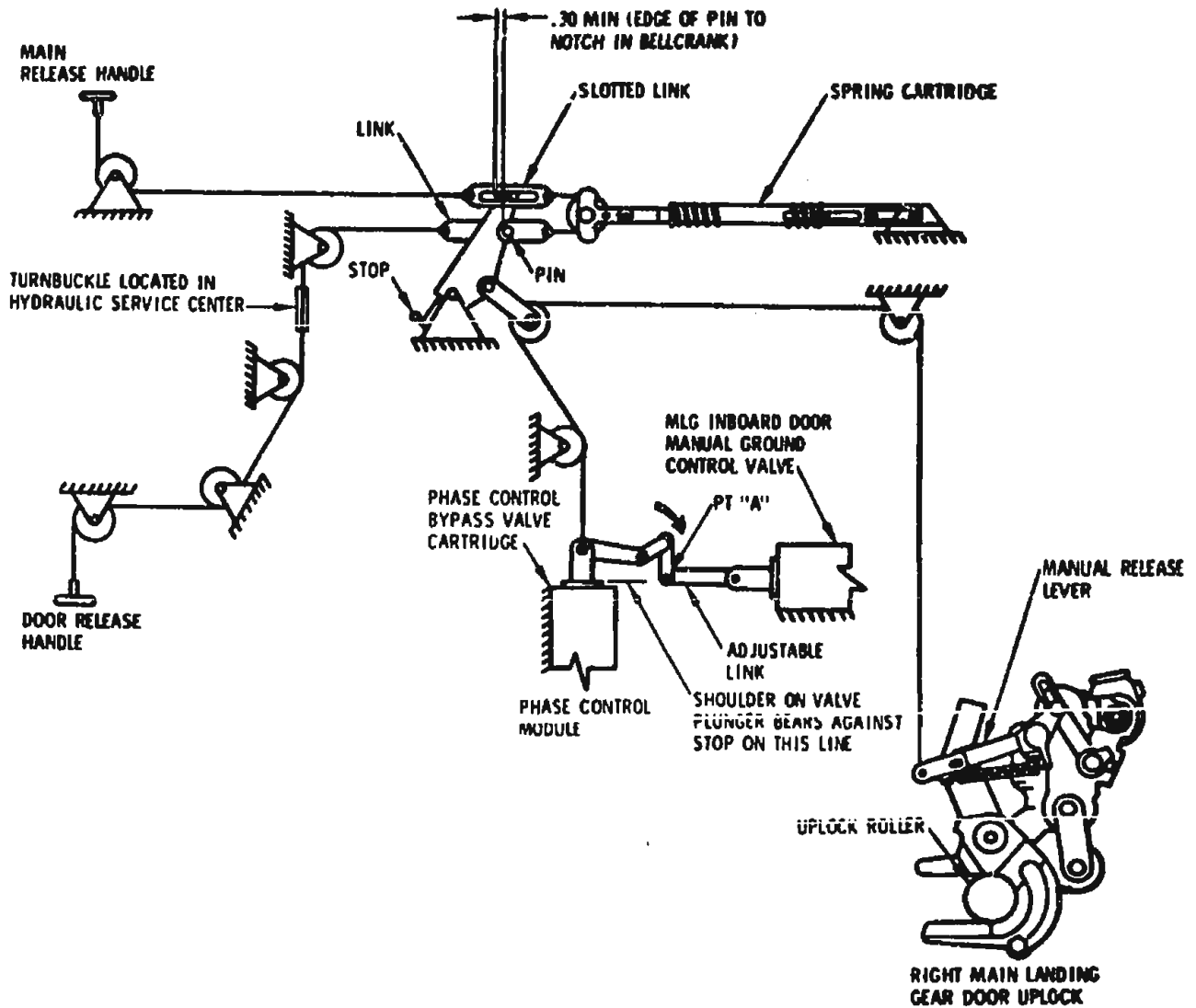
CR C. Re-Rig as follows:

CR Back "Door Release Handle" off its stop 3/8-inch or 3 detent
CR notches. Then take up on turn barrel in Hydraulic Service
CR Center until the bolt holes at disconnected Point "A" are in
CR line (with "Manual Ground Control Valve" bottomed out in
CR actuated position). If you bottom out the "Phase Control
CR Bypass Valve Cartridge" during this adjustment before the
CR holes come into line, complete Step 4 before finishing Step
CR C.



- CR (1) Return "Door Release Handle" to stowed position and
CR verify 0.30-inch min. dimension on enclosed diagram.
- CR (2) Go to Step F.
- CR D. Re-Rig as follows:
- CR Return "Door Release Handle" to stowed position with the
CR entire system in stowed position and Point "A" disconnected.
- CR (1) Place rig pin in "Manual Ground Control Valve". Verify
CR that shoulder on "Phase Control Bypass Valve Cartridge"
CR is bearing on its stop.
- CR (2) Adjust "Adjustable Link" until disconnected Point "A"
CR is in line.
- CR (3) Return to Step B and repeat procedure. If you return
CR to this point again go to Step E.
- CR E. Verify stroke of both valves.
- CR (1) Manual Ground Control Valve Stroke is 1.00 (± 0.010)
CR inch. If valve stroke is less than 0.990-inch, valve
CR must be replaced. Go to Step F.
- CR F. Remove all rig pin, reconnect point "A", and operate system
CR to verify proper operation.

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HA 2451
M1-5500-32-308

CR Main Landing Gear Door Ground Release System - Trouble Shooting
CR Figure 101

R EFFECTIVITY: ALL
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055B

32-33-00
Page 103/104
Mar 15/80

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MAINTENANCE MANUAL

MAIN LANDING GEAR INBOARD DOOR - MAINTENANCE PRACTICES

1. General

When access to the main landing gear (MLG) wheel well requires opening the MLG inboard doors, this procedure is to be followed in order to prevent an unsafe condition.

2. Equipment and Materials

Main Landing Gear Inboard Door Actuator Lock, PN B701-101, or equivalent

3. Referenced Procedures

24-00-00 Electrical Power - Maintenance Practices

29-11-00 Hydraulic Power System - Maintenance Practices

4. Maintenance Practices

A. Open doors as follows (Ref. Fig. 201):

- (1) At pilots center console base (zone 212), ensure that LANDING GEAR UPLOCK MECHANICAL RELEASE LEFT MAIN, NOSE & BYPASS, and RIGHT MAIN T-handles are in and door cover is closed (Ref. Fig. 202).

R

WARNING: PRIOR TO OPENING MLG INBOARD DOORS, BOTH DOOR AREAS MUST BE CLEAR OF PERSONNEL AND EQUIPMENT BEFORE PULLING D-HANDLE.

- (2) In fairing, just forward of MLG door, open manual release access door.
- (3) Pull D-handle to limit of travel so that handle is locked in the full down position. Install safety pin.
- (4) Install MLG door actuator lock (Ref. Fig. 203).

B. Close doors as follows (Ref. Fig. 201):

- (1) Ensure that hydraulic system C pressure is off (Ref. 29-11-00).
- (2) Remove MLG inboard door actuator lock if installed.

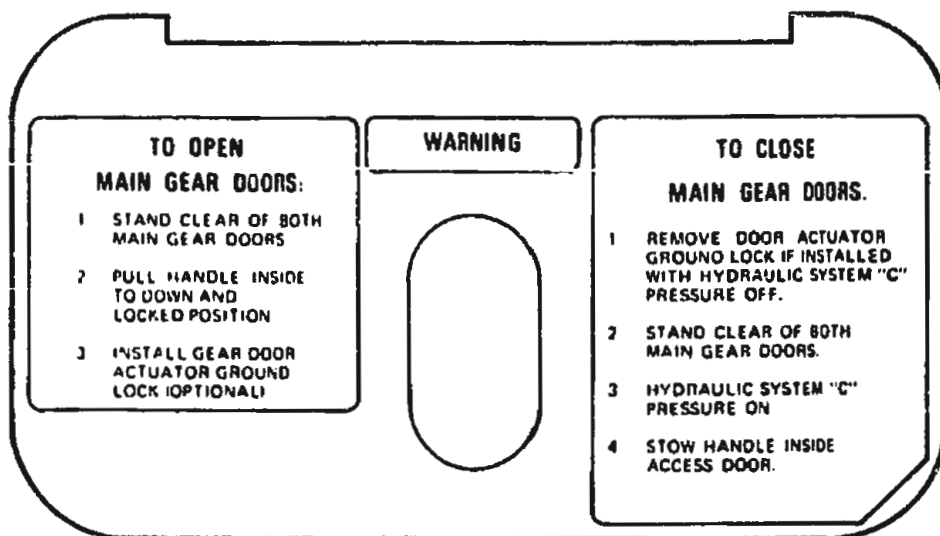
EFFECTIVITY: ALL

0018

32-33-00
Page 201
Mar 15/81

LOCKHEED
MAINTENANCE MANUAL

- (3) Ensure that door area is clear of all personnel and equipment.
- (4) Turn on hydraulic system C pressure (Ref. 29-11-00).
- (5) Remove safety pin, depress release button, and stow D-handle to full up position.



HA 2400
M1 0100 32 221

Instruction Plate
Figure 201

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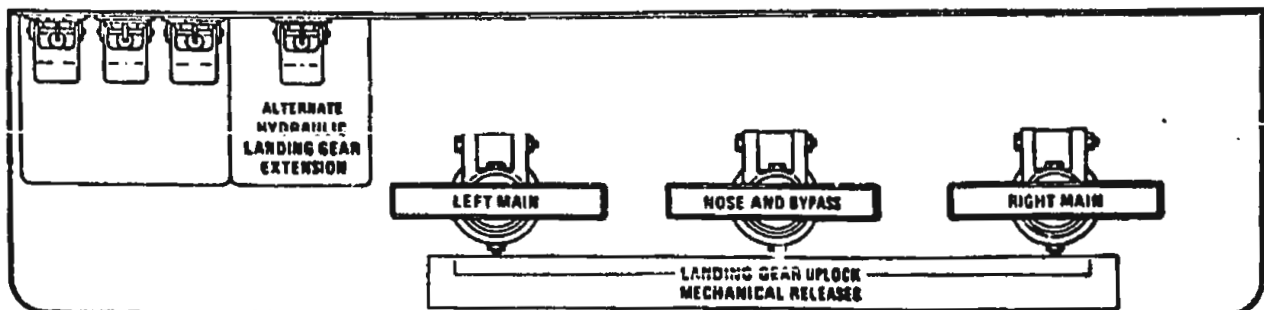
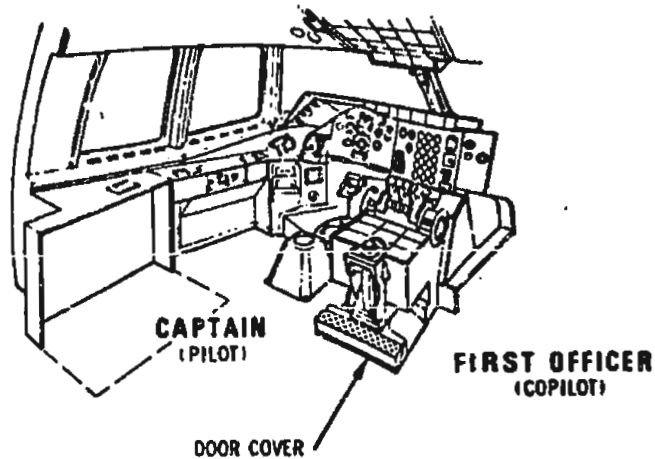
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32-33-00
Page 202
Nov 15/82

LOCKHEED



MAINTENANCE MANUAL



HA 2275
M1-0100-32-290

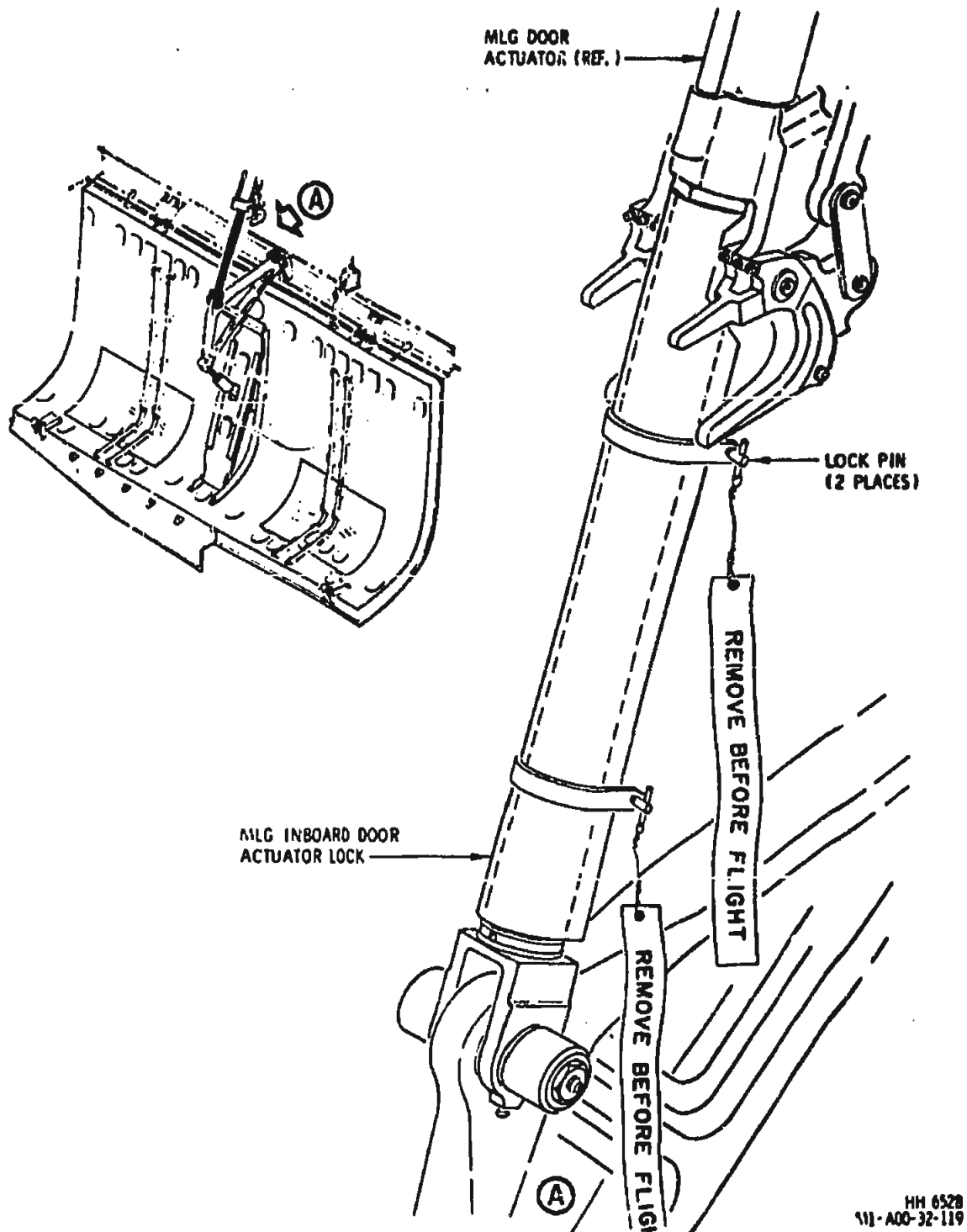
Alternate Mechanical and Hydraulic Landing Gear Extension Controls
Figure 202

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EFFECTIVITY: ALL

32-33-00
Page 203
Nov 15/75

LOCKHEED
MAINTENANCE MANUAL



HH 6528
111-A00-32-119

Main Landing Gear Door Actuator Lock
Figure 203

EFFECTIVITY: ALL

32-33-00
Page 204
Nov 15/75

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MAIN LANDING GEAR INBOARD DOOR ACTUATOR
REMOVAL AND INSTALLATION

1. Equipment and Materials.

Lock-wire, Fed Spec QQ-W-390, 0.032-inch diameter, or equivalent
Cotter Pin, MS24665-149, or equivalent
Cotter Pin, MS24665-153, or equivalent
Container, one quart capacity, or equivalent

2. Referenced Procedures

12-13-01 Hydraulic Bootstrap Reservoir - Servicing
29-11-00 Hydraulic Power System - Maintenance Practices
32-33-00 Main Landing Gear Inboard Door - Maintenance Practices
R 32-33-08 MLG Inboard Door Lock Actuator - Removal and Installation
R
32-61-07 Main Landing Gear Inboard Door Uplock Sensor - Removal and Installation
32-61-07 Main Landing Gear Inboard Door Uplock Sensor - Adjustment and Test

3. Removal/Installation

A. Removal

- (1) Open applicable MLG inboard door and install inboard door actuator lock (Ref. 32-33-00).
- (2) Ensure that hydraulic system C pressure is 0 psi (Ref. 29-11-00).
- (3) Bleed any residual hydraulic pressure from door actuator by opening bleed valve at lower end of actuator cylinder (Ref. Fig. 401).
- (4) Position a container to catch spilling fluid and disconnect hydraulic lines at hydraulic pressure controlled check valve. Tag lines for installation.

EFFECTIVITY: ALL

001B

32-33-01
Page 401
Mar 15/84



MAINTENANCE MANUAL

- (5) Install plugs in hydraulic lines and caps on check valve fittings to prevent contamination.
- R (6) Remove MLG inboard door lock actuator (Ref. 32-33-08).
- (7) Disconnect door manual release cable turnbuckle link from hook release linkage.
- (8) Remove MLG uplock sensor (Ref. 32-61-07).
- (9) Disconnect actuator rod-end from MLG door link (Ref. Fig. 401).

WARNING: THE MLG INBOARD DOOR ACTUATOR WEIGHS APPROXIMATELY 75 LB. CARE MUST BE EXERCISED TO PROPERLY SUPPORT THE ACTUATOR PRIOR TO DISCONNECTING IT FROM THE AIRCRAFT STRUCTURE.

- (10) Support actuator and disconnect from upper universal.
- (11) Remove actuator.

B. Installation

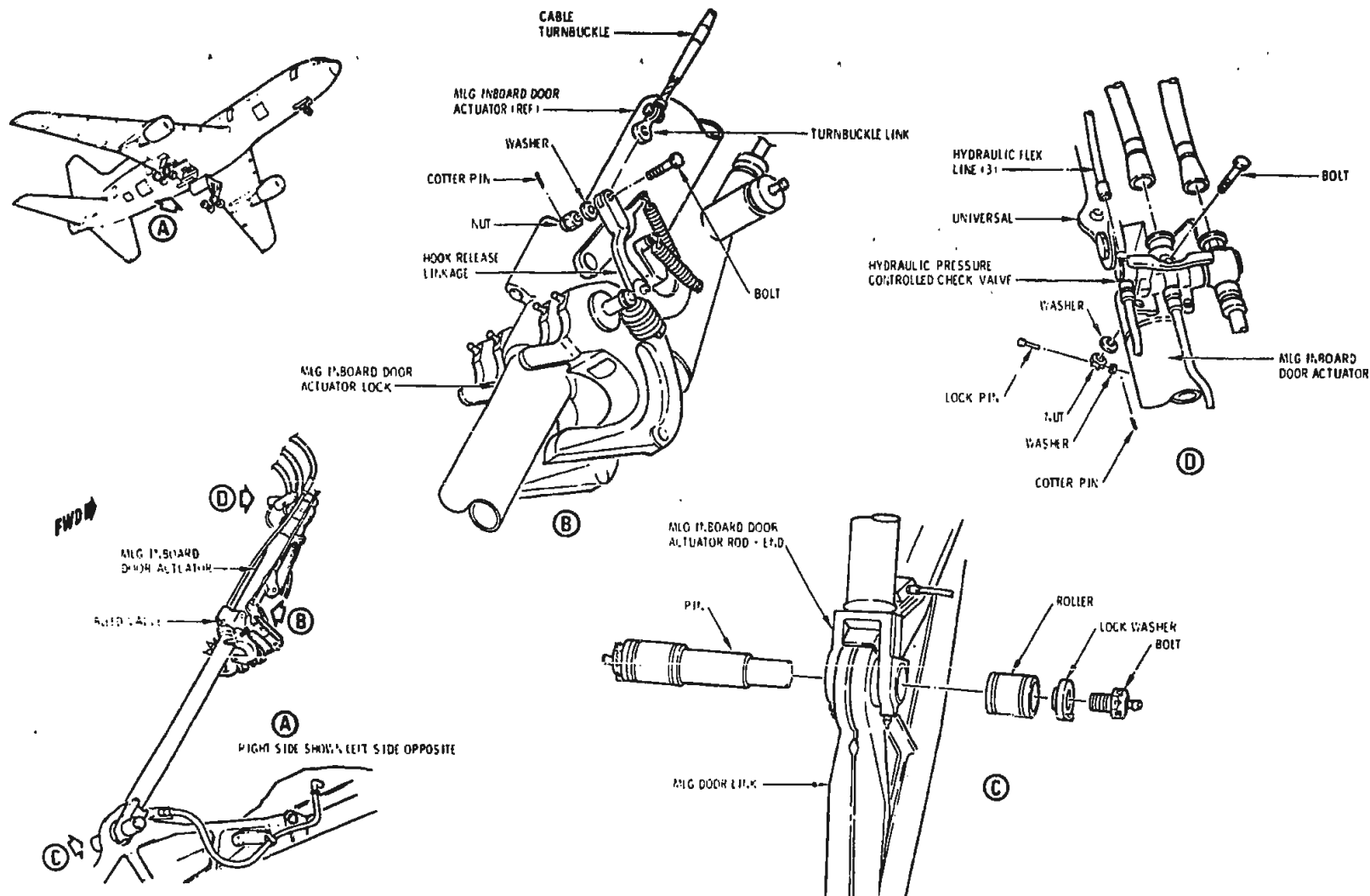
WARNING: THE MLG INBOARD DOOR ACTUATOR WEIGHS APPROXIMATELY 75 LB. CARE MUST BE EXERCISED TO PROPERLY SUPPORT THE ACTUATOR WHILE POSITIONING FOR INSTALLATION.

- (1) Position actuator and connect at upper universal.
- (2) Connect actuator rod-end to MLG door link (Ref. Fig. 401).
- (3) Connect MLG uplock sensor (Ref. 32-61-07).
- (4) Connect door manual release cable turnbuckle link to hook release linkage.
- (5) Remove plugs and caps from hydraulic lines and check-valve fittings.
- (6) Connect hydraulic lines to check-valve. Remove tags from lines.
- R (7) Install MLG inboard door lock actuator (Ref. 32-33-08).
- (8) Ensure that NLG and MLG downlock safety pins are installed.

EFFECTIVITY: ALL

0018

32-33-01
Page 402
Mar 15/84

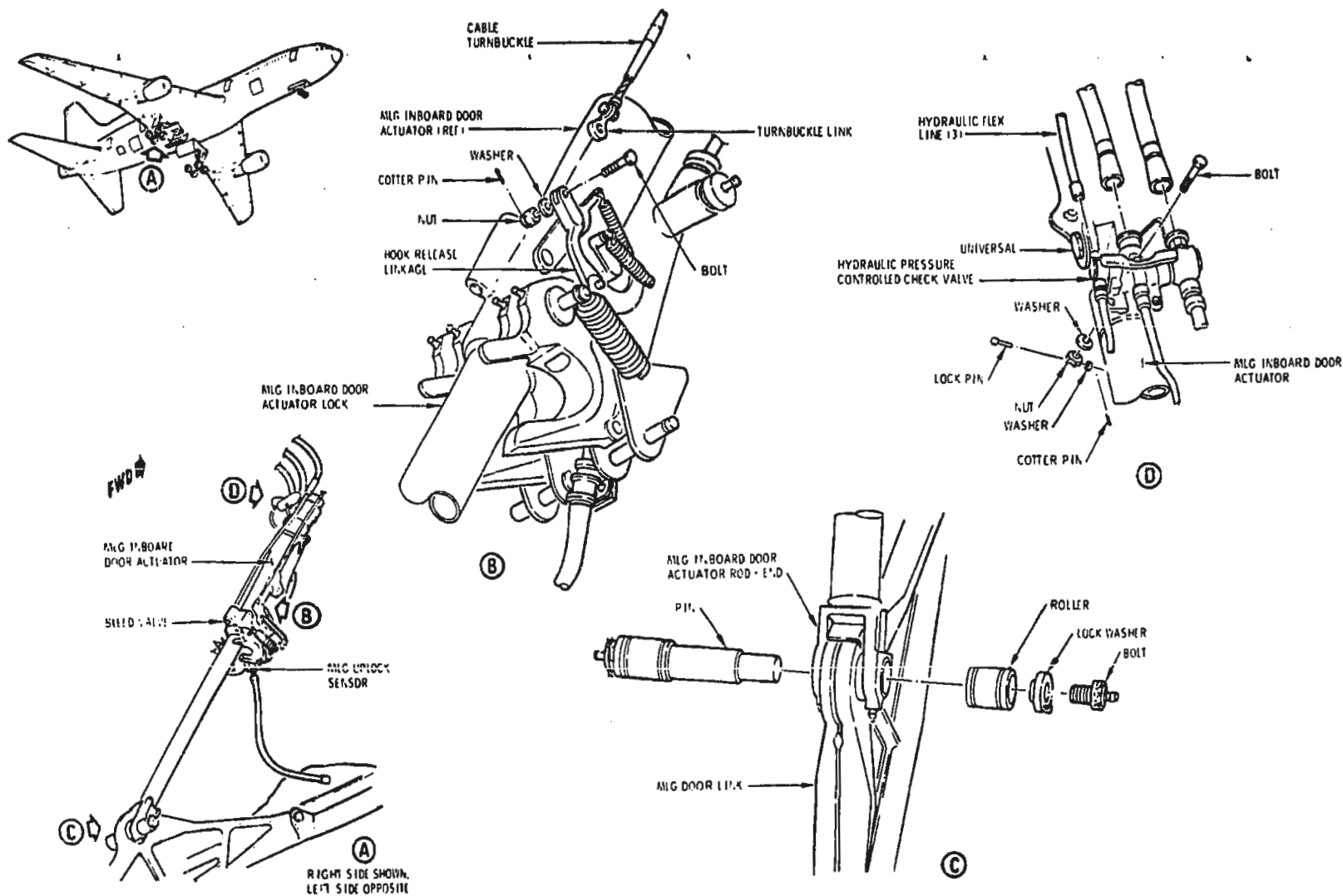


R Main Landing Gear Inboard Door Actuator - Removal and Installation
R Figure 401

EFFECTIVITY: 001-006 WITHOUT SB32-048

32-33-01
Page 403/404
May 15/82

LOCKHEED
MAINTENANCE MANUAL



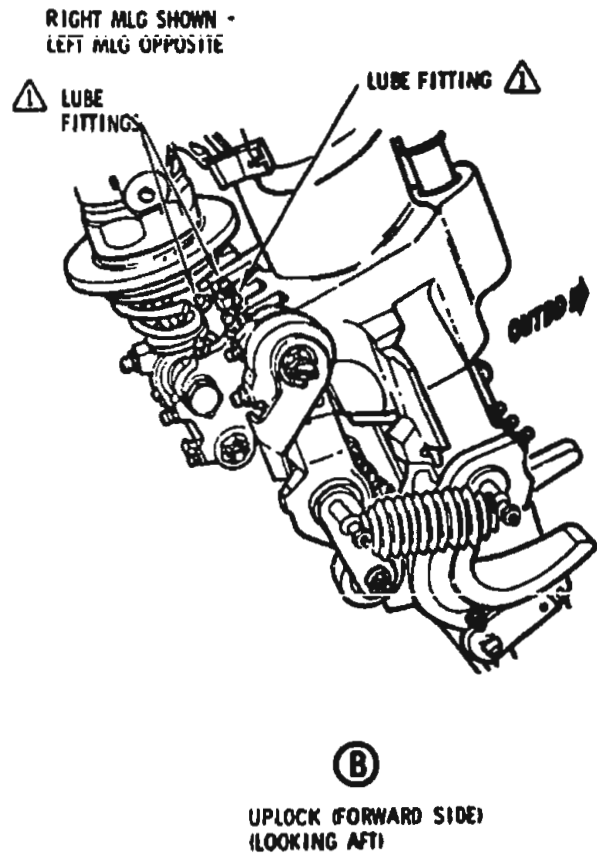
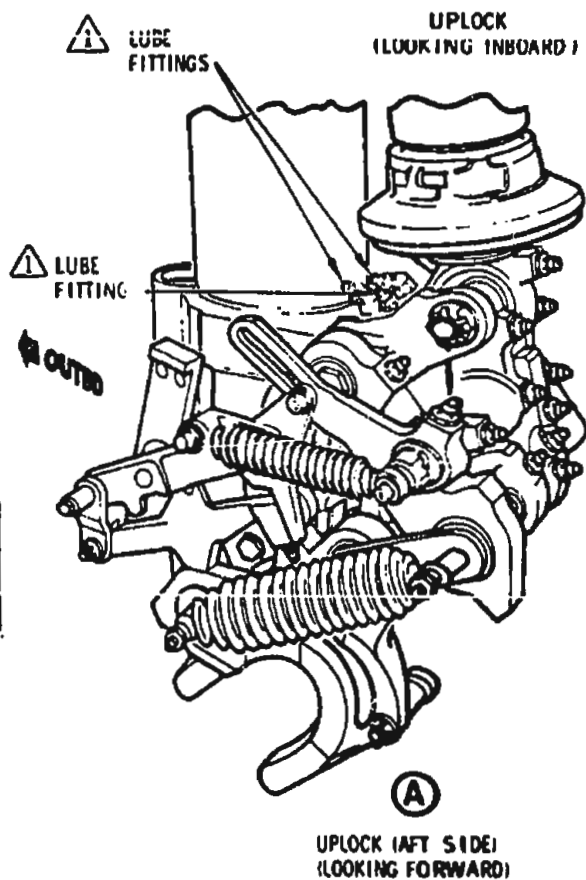
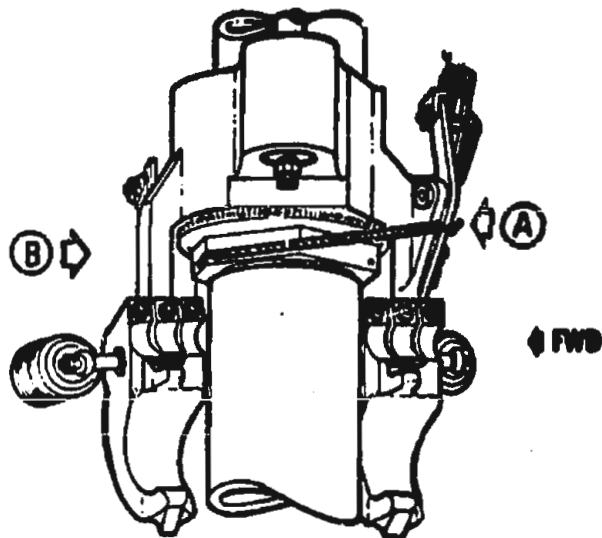
11-010-32-432

R Main Landing Gear Inboard Door Actuator - Removal and Installation
R Figure 401

EFFECTIVITY: 001-006 WITH SB32-048 AND 007-999

32-33-01
Page 405/406
May 15/82

LOCKHEED
MAINTENANCE MANUAL



 ENSURE 45 DEGREE LUBE FITTINGS ARE INSTALLED

M1-0000-32-770

R Main Landing Gear Inboard Door Actuator - Removal and Installation
R Figure 402

R EFFECTIVITY: ALL
R

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32-33-01
Page 407
Aug 15/82



MAINTENANCE MANUAL

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

CR

- (9) Turn on hydraulic system C pressure (Ref. 29-11-00).
- (10) Place LANDING GEAR control lever to DOWN position.
- (11) At lower and upper end of actuator, open bleed valve to bleed air from actuator. Catch any spilling hydraulic fluid.
- (12) Ensure that LANDING GEAR control lever is in DOWN position.
- (13) Close and open applicable MLG inboard door several times to ensure that all air has been removed from actuator.
- (14) Bleed air from applicable hydraulic reservoir (Ref. 12-13-01).
- (15) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (16) Perform main landing gear uplock sensor adjustment and test (Ref. 32-61-07).

EFFECTIVITY: ALL

0018

32-33-01
Page 408
Nov 15/86

LOCKHEED
MAINTENANCE MANUAL

R MAIN LANDING GEAR INBOARD DOOR GROUND CONTROL VALVE
R REMOVAL AND INSTALLATION

R 1. Equipment and Material

- R Rig Pin, steel, 5/16-inch diameter, 4 inches long, or equivalent
R Cotter Pin, MS24665-153, or equivalent
R Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent
R Container, 2-quart capacity, or equivalent

R 2. Referenced Procedures

- R 29-11-00 Hydraulic Power System - Maintenance Practices
R 32-10-00 Main Landing Gear Inboard Door - Maintenance
R Practices

R 3. Removal/Installation

R A. Removal

- R (1) Open applicable main landing gear (MLG) inboard door
R and install MLG inboard door actuator lock (Ref.
R 32-10-00).
R (2) Open hydraulic service center access door 147 BB to
R gain entrance.
R (3) Ensure that hydraulic system C pressure is 0 psi (Ref.
R 29-11-00).
R (4) Remove bolt connecting ground control valve actuating
R arm to control rod (Ref. Fig. 401).
R (5) Position container under valve to catch any spilling
R fluid.
R (6) Disconnect hydraulic lines.
R (7) Remove adapters from valve ports and retain for
R installation in replacement valve.
R (8) Plug hydraulic lines and valve ports to prevent
R contamination.

R EFFECTIVITY: ALL
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001B

32-33-02
Page 401
May 15/74

LOCKHEED
MAINTENANCE MANUAL

R (9) Remove mounting bolts and remove valve.

R **B. Installation**

R (1) Position valve on mounting bracket and secure, in place
R with bolts and washer (Ref. Fig. 401).

R (2) Remove protective plugs from valve ports and install
R adapters removed from replaced valve.

R (3) Remove protective plugs from hydraulic lines and
R connect lines to valve adapters.

R (4) Connect valve actuating arm to control rod using bolt,
R washer, and nut. Safety nut with cotter pin.

R (5) Adjust valve control linkage as follows:

R (a) In applicable MLG wheel well, remove bolt securing
R control rod to bellcrank.

R (b) Ensure that hydraulic system C pressure is 0 psi,
R and stow manual door opening D-handle to fully up
R position.

R (c) In hydraulic service center, install rig pin in
R valve actuating arm.

R (d) In wheel well, verify that phase control valve
R plunger is bottomed out against valve body.

R (e) Adjust control rod end so that rig pin in ground
R control valve actuating arm can be freely rotated
R in rigging hole when control rod is connected to
R bellcrank and phase control valve plunger is
R bottomed out against valve body.

R (f) Tighten control rod lock nut and safety with
R lock-wire.

R (g) Remove rig pin from ground control valve actuating
R arm.

R (h) Return manual door opening D-handle to deployed
R (fully down) position.

R (6) Test ground control valve as follows:

R (a) Close, open, and reclose applicable MLG inboard
R door (Ref. 32-10-00).

R (b) Inspect ground control valve for hydraulic leaks.

R EFFECTIVITY: ALL

32-33-02
Page 402
May 15/74

LOCKHEED
MAINTENANCE MANUAL

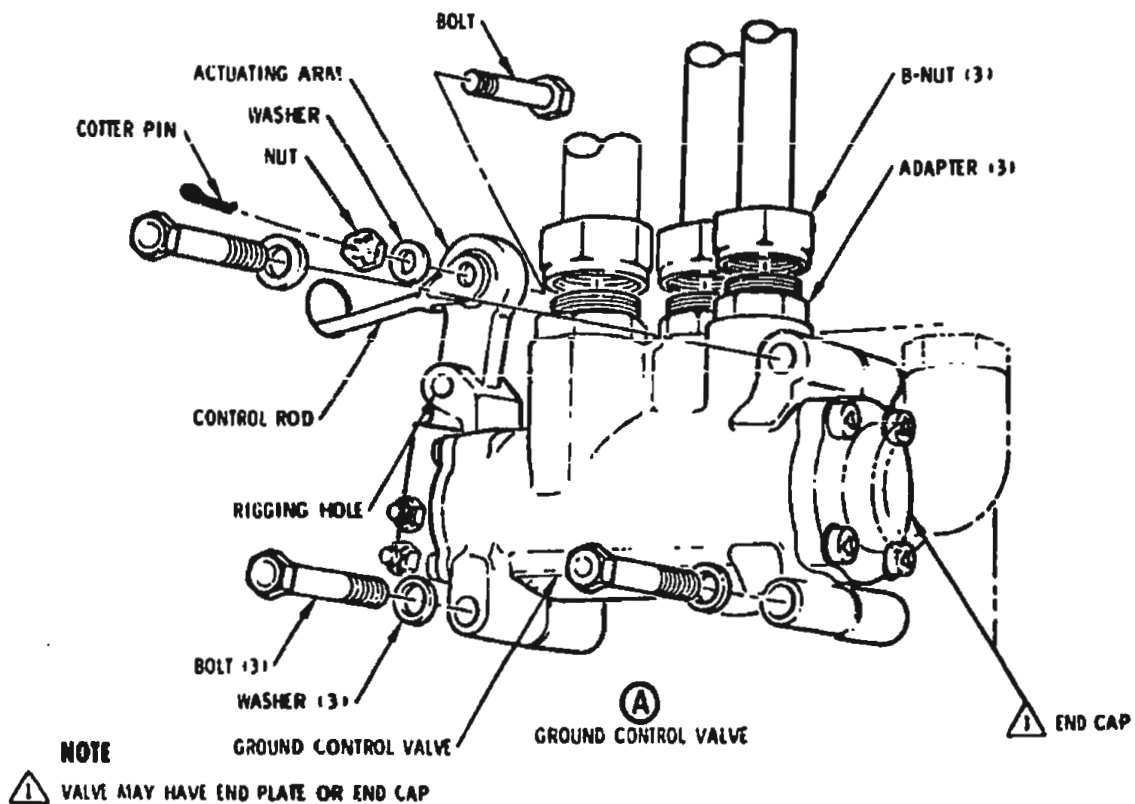
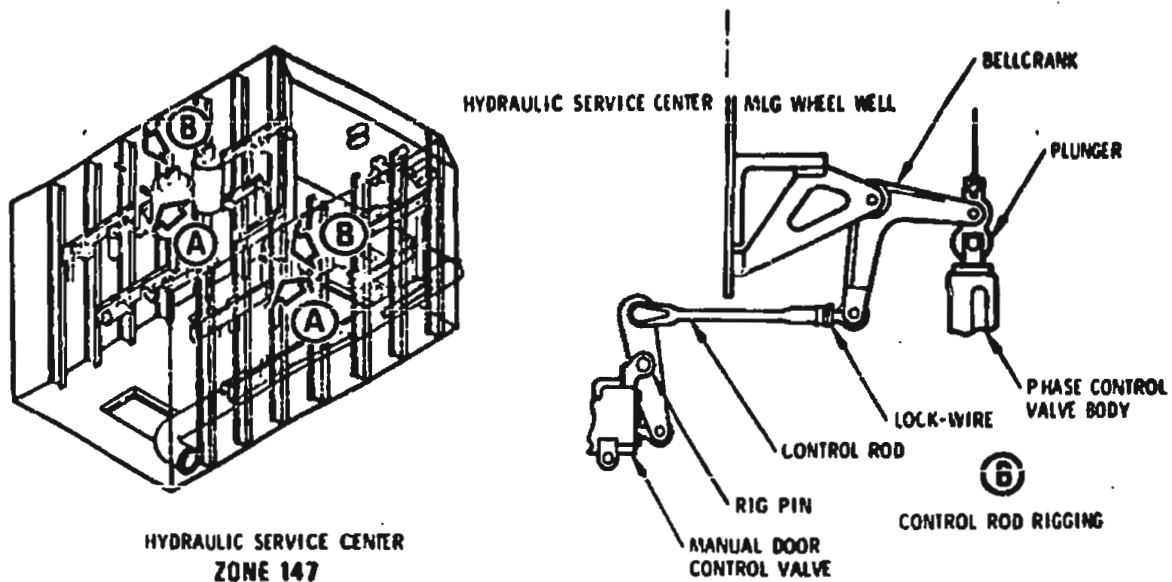
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(c) Close hydraulic service center access door 147 BB.

R EFFECTIVITY: ALL
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32-33-02
Page 403
May 15/74

LOCKHEED
MAINTENANCE MANUAL



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**Main Landing Gear Inboard Door Control Valve
Removal and Installation
Figure 401**

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EFFECTIVITY: ALL

32-33-02
Page 404
May 15/74

LOCKHEED
MAINTENANCE MANUAL

PRESSURE CONTROLLED CHECK VALVE - REMOVAL AND INSTALLATION

1. Equipment and Materials

Container, two-quart capacity, or equivalent

2. Referenced Procedures

24-00-00 Electrical Power - Maintenance Practices
29-11-00 Hydraulic Power System - Maintenance Practices
32-10-00 Main Landing Gear Inboard Door - Maintenance Practices

3. Removal/Installation

A. Removal

- (1) Open applicable main landing gear (MLG) inboard door and install MLG inboard door actuator lock (Ref. 32-10-00).
- (2) Ensure that hydraulic system C pressure is 0 psi (Ref. 29-11-00).
- (3) Position container under valve to catch spilling hydraulic fluid.

R

WARNING: HYDRAULIC PRESSURE MAY BE RETAINED IN MLG INBOARD DOOR ACTUATOR WHICH MUST BE BLED OFF TO PREVENT POSSIBLE INJURY TO PERSONNEL.

- (4) At top and bottom of actuator, bleed off any residual hydraulic pressure.
- (5) Disconnect flexible hydraulic lines at top of valve (Ref. Fig. 401).
- (6) Remove adapters from valve ports and retain for installation in replacement valve.
- (7) Plug hydraulic lines and valve ports to prevent contamination.
- (8) Loosen B-nuts on rigid hydraulic lines.

EFFECTIVITY: ALL

001B

32-33-04
Page 401
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL

- (9) Remove bolts and nuts securing valve to MLG inboard door actuator.
- (10) Disconnect rigid hydraulic lines from valve and remove valve.
- (11) Remove adapters from valve and retain for installation in replacement valve.
- (12) Plug hydraulic lines and valve ports to prevent contamination.

B. Installation

- (1) Ensure that hydraulic system C pressure is 0 psi (Ref. 29-11-00).
- (2) Remove plugs and install adapters in lower ports of valve.
- (3) Remove plugs from rigid hydraulic lines and install lines on valve adapters. Do not tighten B-nuts at this time.
- (4) Secure valve to actuator using bolts and nuts.
- (5) Tighten B-nuts.
- (6) Remove plugs from upper ports of valve and install adapters.
- (7) Connect flexible hydraulic lines to valve adapters.
- (8) Check valve as follows:

- R (a) Ensure that hydraulic system C pressure is on.
- R (b) Close, open, and reclose MLG inboard doors three or four cycles (Ref. 32-10-00).
- R (c) Bleed off any residual air from actuator bleed fittings.
- R (d) Ensure that hydraulic system C accumulator is charged and that hydraulic system C pressure is off.
- R (e) Ensure that downlock safety pins are installed in nose landing gear and both main landing gears.
- R (f) Turn on electrical power (Ref. 24-00-00).

EFFECTIVITY: ALL

32-33-04
Page 402
Dec 15/91

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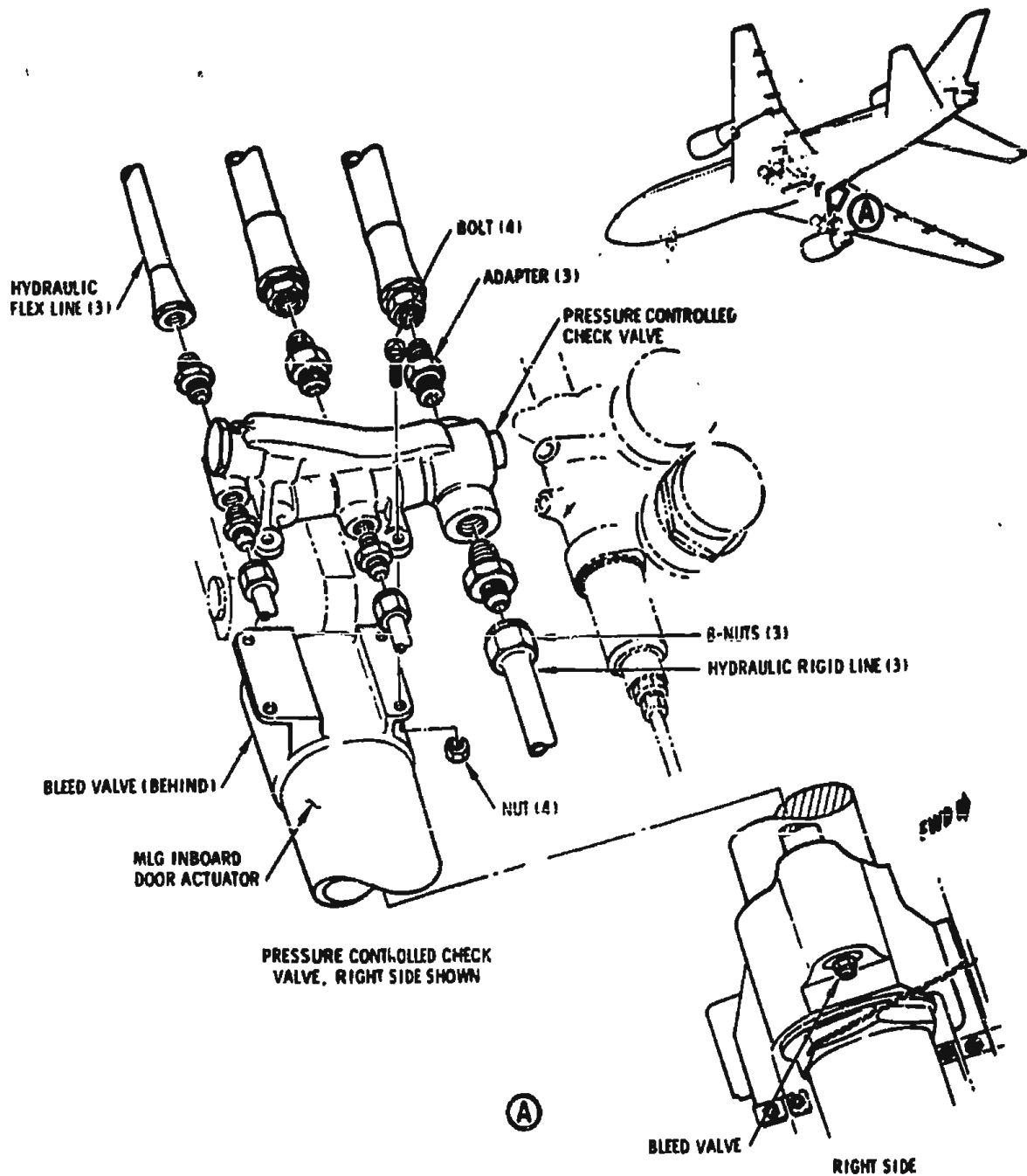


MAINTENANCE MANUAL

- R (g) On pilots overhead circuit breaker panel CB1,
R ensure that ALTN GEAR CONT circuit breaker is
R closed.
- R (h) At base of pilots center console, open access door
R and position ALTERNATE HYDRAULIC LANDING GEAR
R EXTENSION switch to the on position.
- R (i) After door has opened, install MLG inboard door
R actuator lock.
- R (j) Bleed off any residual air from actuator bleed
R fittings.
- R (k) Return switch to off position.
- R (l) Inspect valve and valve connections for hydraulic
R leaks.
- R (m) Close MLG inboard door as applicable (Ref.
R 32-10-00).
- R (n) Turn off electrical power as applicable (Ref.
R 24-00-00 and 29-11-00).

001B EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL



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Pressure Controlled Check Valve - Removal and Installation
Figure 401

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EFFECTIVITY: ALL

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32-33-04
Page 404
May 15/74

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR RUN-AROUND VALVE - REMOVAL AND INSTALLATION

1. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, Temp A, 0.032-inch diameter, or equivalent

Hydraulic Fluid, LAC Spec C-34-1224, Type III, or equivalent

Container (wide lip) 1-quart capacity

2. Referenced Procedures

29-11-00 Hydraulic Power System - Maintenance Practices

R 32-10-00 Main Landing Gear Inboard Door - Maintenance Practices

3. Removal/Installation

A. Removal

- (1) Open applicable MLG inboard door and install MLG door actuator lock (Ref. 30-10-00).
- (2) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (3) Place container under phase control valve module to catch spilled hydraulic fluid (Ref. Fig. 401).
- (4) Using a wrench, loosen cartridge.
- (5) Unscrew cartridge and remove from phase control valve module.

B. Installation

- (1) Ensure that hydraulic system C pressure is off (Ref. 29-11-00).
- (2) Inspect cartridge seals and packing for wear and damage.
- (3) Lubricate seals, packing, and phase control valve module bore with hydraulic fluid.
- (4) Install cartridge in module bore, torque 80 (± 10) lb in., and lock-wire.

EFFECTIVITY: ALL

001B

32-33-05
Page 401
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL

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NOTE: Lock-wire cartridge to module body and not to differential priority valve.

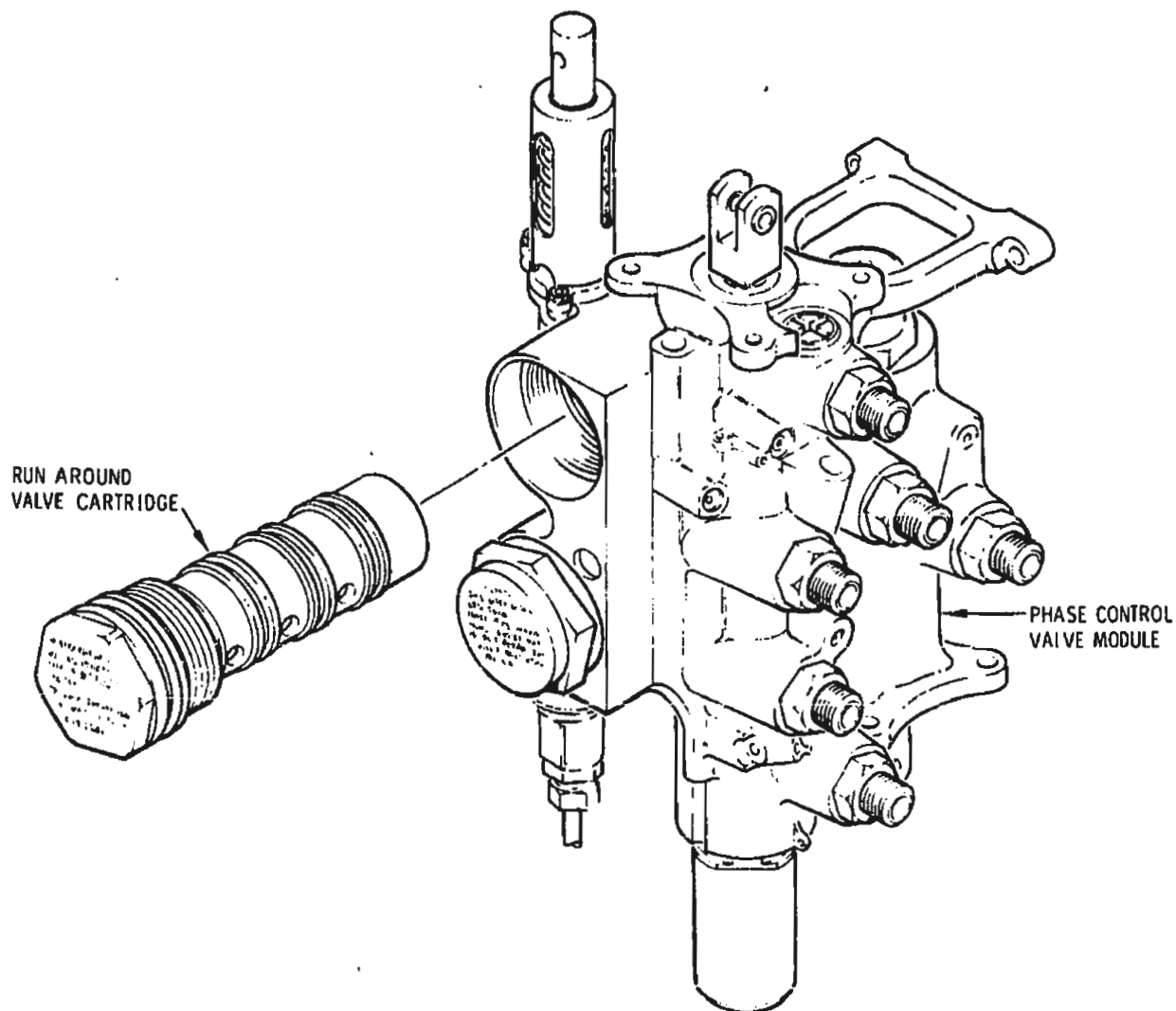
- (5) Remove MLG door actuator lock and close MLG inboard door (Ref. 32-10-00).

EFFECTIVITY: ALL

0018

32-33-05
Page 402
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL



HA 0140
M1-0100-32-245

Main Landing Gear Run-around Valve - Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-33-05
Page 403/404
Mar 15/73

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LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR PHASE CONTROL VALVE MODULE
REMOVAL AND INSTALLATION

1. General

The main landing gear phase control valve is mounted on the inboard bulkhead of the main landing gear wheel well. Brackets bolted to the valve provide mounting for mechanical inputs.

2. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, Temp A, 0.032-inch diameter, or equivalent

Cotter Pin MS24665-149, or equivalent

Cotter Pin MS24665-151, or equivalent

Container, 2-quart capacity

Environmental Seal, LAC Spec C-40-769, Type I or II, or equivalent

Grease, Aeroshell 7, or equivalent

Hydraulic line and port plugs and caps

3. Referenced Procedures

20-51-04 Environmental Sealing of Model L-1011 Airplane
 (PB75-425)

29-11-00 Hydraulic Power System - Maintenance Practices

32-30-00 Landing Gear Retraction and Extension - Adjustment
 and Test

32-33-00 Main Landing Gear Door Actuation - Maintenance
 Practices

32-37-00 Landing Gear Mechanical Alternate Extension System
 - Adjustment and Test

4. Removal/Installation

A. Removal

LOCKHEED
MAINTENANCE MANUAL

- (1) Open applicable MLG inboard door and install MLG door actuator lock (Ref. 32-33-00).
- (2) Insert downlock safety pins in nose landing gear and main landing gear.
- (3) Ensure that hydraulic system C pressure is 0 psi (Ref. 29-11-00).

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CAUTION: DO NOT REMOVE UPPER BOLT AND LINK. LINK CAN BE INSTALLED 180° OUT CAUSING A BIND. GREASE FITTING ON LINK MUST FACE INBOARD.

- (4) Disconnect upper and lower phase control valve linkages (Ref. Fig. 401).
- (5) Remove upper and lower input brackets.
- (6) Disconnect cable from top of bypass valve.
- (7) Position container to catch spilled hydraulic fluid.
- (8) Disconnect hydraulic lines. Cap and plug hydraulic lines and valve ports to prevent contamination and excessive spillage of hydraulic fluid.
- (9) Remove mounting bolts securing valve to bracket.
- (10) Remove valve.

B. Installation

- (1) Ensure that downlock safety pins are installed in nose landing gear and both main landing gears.
- (2) Ensure that hydraulic system C pressure is turned off.

CAUTION: ENSURE GREASE FITTING, LOCATED ON INPUT LINK ASSEMBLY OF GEAR OPERATED VALVE, IS FACING INBOARD PRIOR TO REINSTALLATION OF PHASE CONTROL MODULE.

- (3) Secure phase control valve to mounting bracket with bolts.
- (4) Connect hydraulic lines to valve.
- (5) Connect cable to bypass valve with bolt, washers, and nut. Safety nut with cotter pin.
- (6) Coat threads of upper and lower input bracket bolts with environmental seal (Ref. 20-51-04).

EFFECTIVITY: ALL

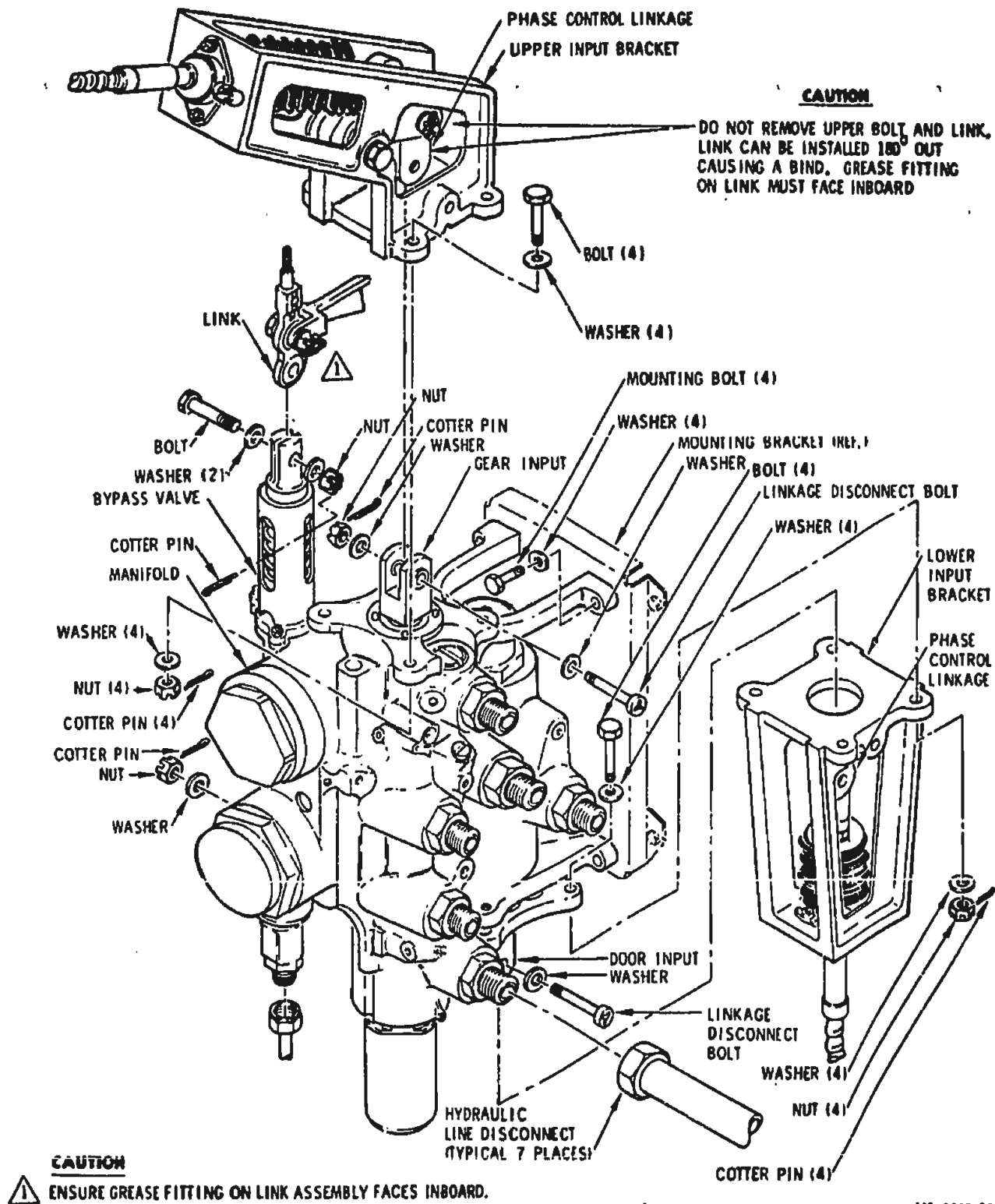
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32-33-06
Page 402
Jul 15/83



- (7) Position brackets to valve and secure with wet-installed bolts. Safety bolts with cotter pins.
 - (8) Connect upper and lower phase control valve linkages. Safety nuts with cotter pins.
 - (9) Ensure that applicable inboard door is fully open and that door actuator lock is installed.
 - (10) Remove two pivot bolts: one from landing gear output bracket and one from door output bracket (Ref. Fig. 402).
 - (11) Install two 5/16-inch rig pins in rigging locations.
 - (12) Adjust control end fittings next to removed pivot bolts until holes are aligned and pivot bolts can be installed by hand. Ensure that sufficient thread is engaged (observe through witness hole) with end fitting.
- NOTE: Sufficient thread is engaged when a 1/16-inch (0.062 inch) diameter wire cannot be inserted through end fitting witness hole without being stopped by threaded rod end.
- (13) Tighten locknut and safety with lock-wire. Tighten pivot bolts and safety with cotter pins.
 - (14) Remove rig pins.
 - (15) Remove MLG door actuator lock and close MLG inboard door (Ref. 32-33-00).
 - (16) Perform landing gear retraction and extension - adjustment and test (Ref. 32-30-00).
 - (17) Perform landing gear alternate mechanical extension - adjustment and test (Ref. 32-37-00).

LOCKHEED
MAINTENANCE MANUAL



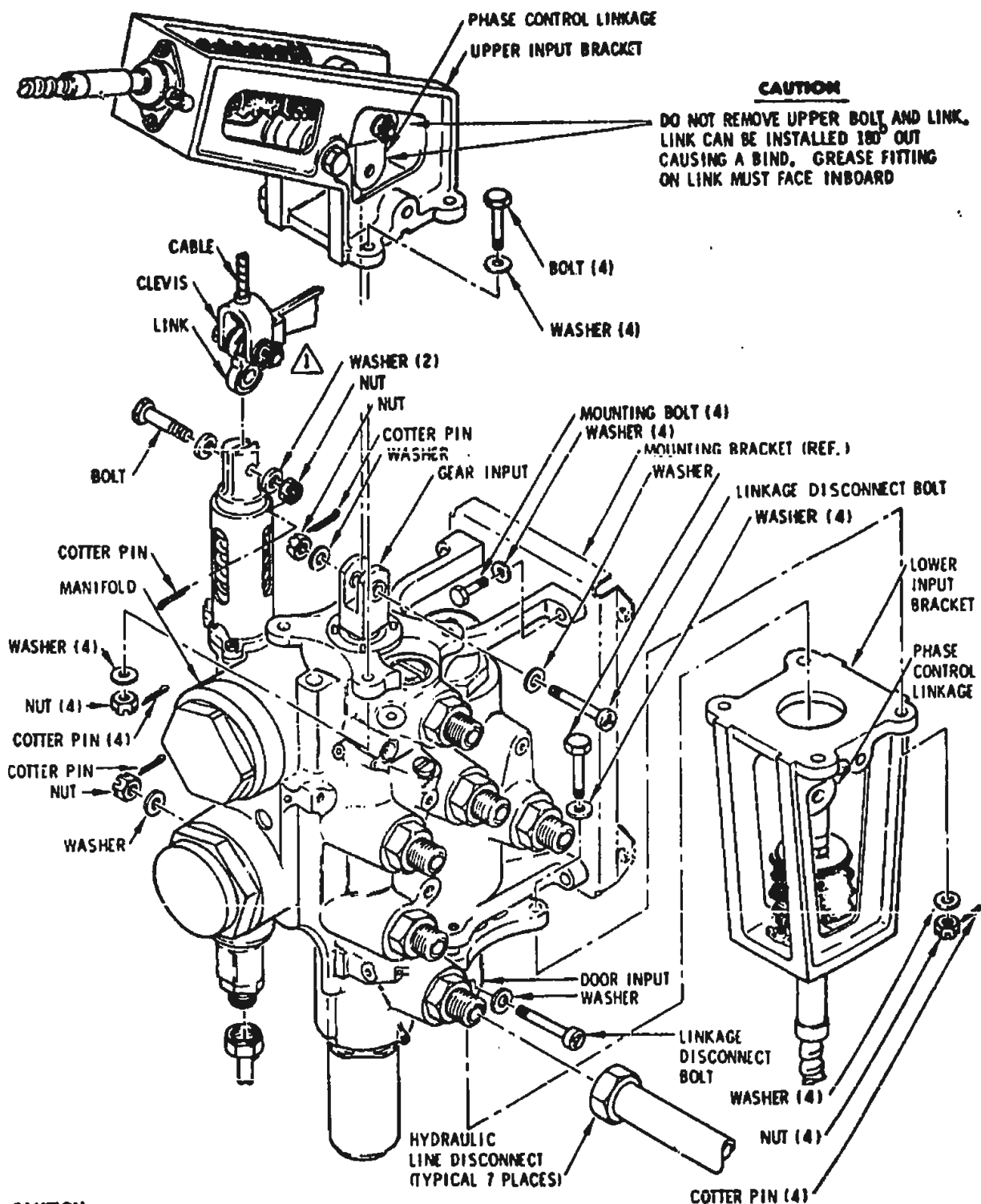
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**Main Landing Gear Phase Control Valve Module
Removal and Installation
Figure 401**

EFFECTIVITY: 001-023 WITHOUT SB32-081

32-33-06
Page 404
Jul 15/83

LOCKHEED
MAINTENANCE MANUAL



CAUTION

DO NOT REMOVE UPPER BOLT AND LINK. LINK CAN BE INSTALLED 180° OUT CAUSING A BIND. GREASE FITTING ON LINK MUST FACE INBOARD

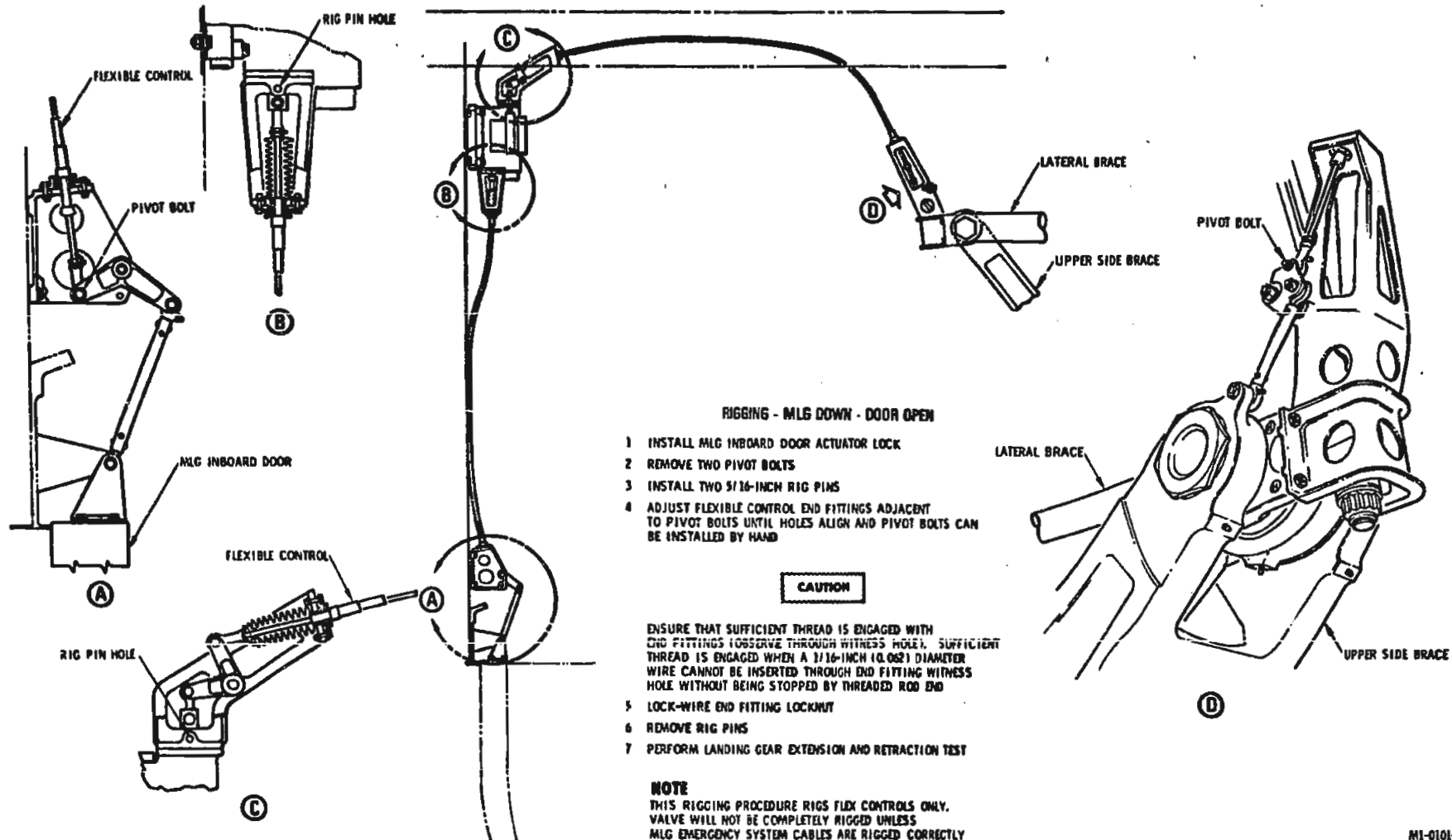
CAUTION
⚠ ENSURE GREASE FITTING ON LINK ASSEMBLY FACES INBOARD.

MI-0000-32-2927

Main Landing Gear Phase Control Valve Module
Removal and Installation
Figure 401

EFFECTIVITY: 001-023 WITH SB32-081 AND 024-999

32-33-06
Page 405/406
Jul 15/83



Phase Control Valve Rigging
Figure 402

EFFECTIVITY: ALL

32-33-06
Page 407/408
Feb 15/75

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LOCKHEED
MAINTENANCE MANUAL

MLG INBOARD DOOR LOCK ACTUATOR - REMOVAL INSTALLATION

1. Equipment and Materials

Cotter Pin, MS24665-300, or equivalent

Lock-wire, Fed Spec QQ-W-390, 0.032-inch diameter, or equivalent

Gasket (O-ring) NAS 1612-4, or equivalent

Container, one quart capacity, or equivalent

2. Referenced Procedures

12-13-01 Hydraulic Bootstrap Reservoir - Servicing

29-11-00 Hydraulic Power System - Maintenance Practices

32-10-00 Main Landing Gear Inboard Door - Maintenance Practices

3. Removal/Installation

A. Removal

- (1) Open applicable MLG inboard door and install inboard door actuator lock (Ref. 32-10-00).
- (2) Ensure main landing gear and nose landing gear downlock safety pins are installed.
- (3) Ensure that hydraulic system C pressure is 0 psi (Ref. 29-11-00).
- (4) On pilots overhead circuit breaker panel CB1, open and tag circuit breaker ALTN GEAR CONT (L14).
- (5) Bleed any residual hydraulic pressure from lock actuator by opening bleed port at lower end of actuator cylinder (Ref. Fig. 401).
- (6) Position a container to catch spilling fluid and disconnect hydraulic lines (Ref. Fig. 401). Tag lines for installation.
- (7) Install protective covers on hydraulic lines and fittings to prevent contamination.

R EFFECTIVITY: ALL
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001B

32-33-08
Page 401
Mar 15/91

LOCKHEED
MAINTENANCE MANUAL

- (8) Remove mounting bolts securing lock actuator to door actuator and remove lock actuator (Ref. Fig. 401).

B. Installation

- (1) Install lock actuator on door actuator with mounting bolts (Ref. Fig. 401).
- (2) Remove protective covers from hydraulic lines and fittings.
- (3) Install hydraulic lines with new O-ring gaskets on lock actuator. Remove tags from lines.
- (4) Remove MLG inboard door actuator lock (Ref. 32-10-00).
- (5) Remove tag and close circuit breaker opened in Step 3A(4).

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

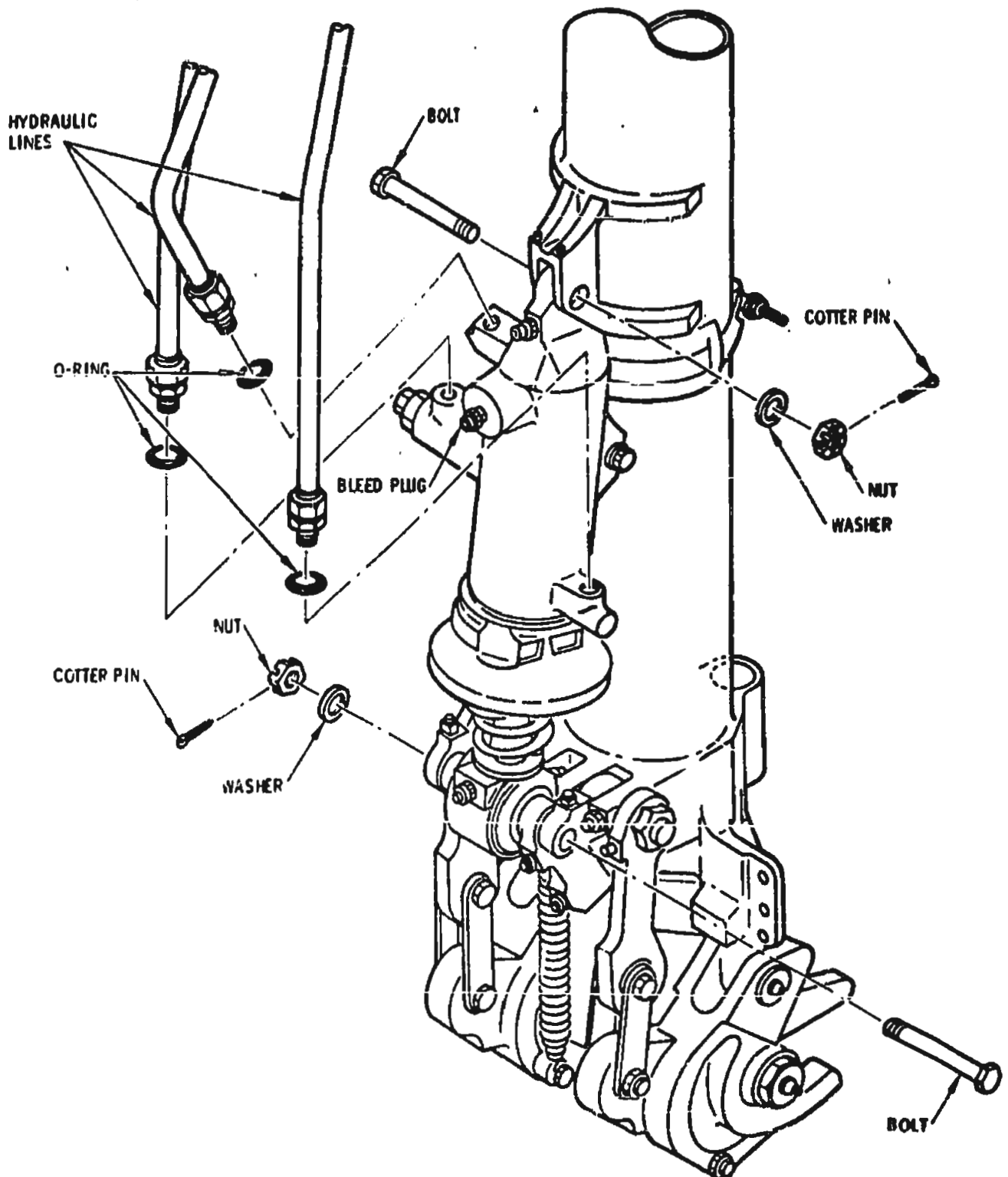
LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEM CAN ACCEPT HYDRAULIC PRESSURE.

- (6) Turn on hydraulic system C pressure (Ref. 29-11-00).
- (7) At lower end of actuator, open bleed valve to bleed air from actuator. Catch any spilling hydraulic fluid.
- (8) Close and open applicable MLG inboard door several times to ensure that all air has been removed from actuator.
- (9) Ensure bleed valve is closed, then lock-wire.
- (10) Bleed air from applicable hydraulic reservoir (Ref. 12-13-01).
- (11) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (12) Remove main landing gear and nose gear downlock safety pins.

LOCKHEED
MAINTENANCE MANUAL



M1-0000-32-763

R Main Landing Gear Inboard Door Lock Actuator - Removal and
R Installation
R Figure 401

R EFFECTIVITY: ALL
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32-33-08
Page 403/404
Nov 15/81

LOCKHEED
MAINTENANCE MANUAL

R DIFFERENTIAL PRIORITY CARTRIDGE VALVE - REMOVAL AND INSTALLATION

R 1. Equipment and Materials

- R Lock-wire, Fed Spec QQ-W-390, Temp A, 0.032-inch diameter, or
R equivalent
- R Hydraulic Fluid, LAC Spec C-34-1224, Type III, or equivalent
- R Container (wide lip) 1-quart capacity
- R Trichloroethylene, Fed Spec O-T-634, or equivalent

R 2. Referenced Procedures

- R 29-11-00 Hydraulic Power System - Maintenance Practices
- R 32-10-00 Main Landing Gear Inboard Door - Maintenance
R Practices

R 3. Removal/Installation

R A. Removal

- R (1) Open applicable MLG inboard door and install door
R actuator lock (Ref. 32-10-00).
- R (2) Ensure that hydraulic system C pressure is 0 psi (Ref.
R 29-11-00).
- R (3) Place container under phase control valve module to
R catch spilled fluid (Ref. Fig. 401).
- R (4) Clean cartridge valve cap and surrounding area with
R lint-free cloth dampened with trichloroethylene.
- R (5) Using a wrench, loosen cartridge.
- R (6) Unscrew cartridge and remove from phase control valve
R module.
- R (7) If valve is not immediately replaced, plug module port
R to prevent contamination.

R B. Installation

- R (1) Ensure that hydraulic system C pressure is turned off
R (Ref. 29-11-00).

R EFFECTIVITY: ALL

32-33-09
Page 401
Dec 15/93

001B

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MAINTENANCE MANUAL

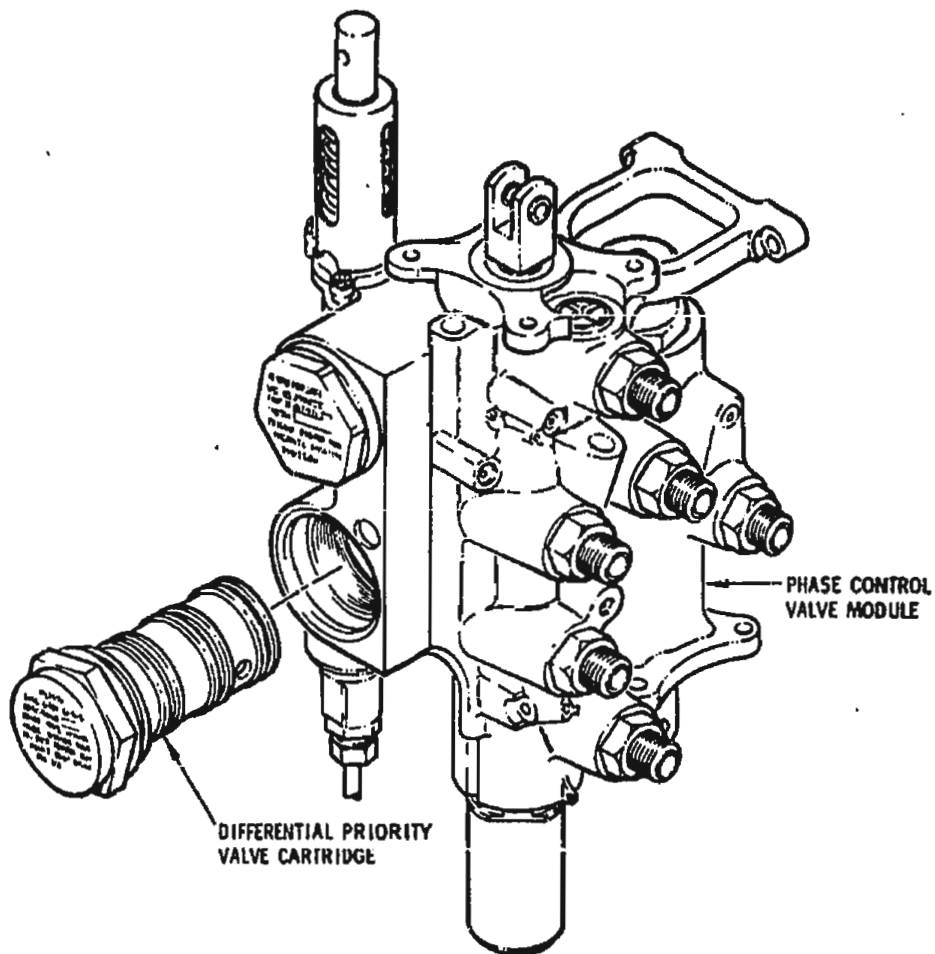
- R (2) Inspect cartridge seals and packing for wear and
R damage. Replace as required.
- R (3) Lubricate seals, packing, and phase control valve
R module bore with hydraulic fluid.
- R (4) Install cartridge in module bore, torque 80 (± 10) lb
R in., and lock-wire.
- R NOTE: Lock-wire cartridge to module body and not to
R runaround valve.
- R (5) Remove MLG door actuator lock and close MLG door (Ref.
R 32-10-00).

R EFFECTIVITY: ALL
R

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32-33-09
Page 402
Dec 15/93

LOCKHEED
MAINTENANCE MANUAL



HA 0141
M1-0100-32-244

R Differential Priority Cartridge Valve - Removal and Installation
R Figure 401

R EFFECTIVITY: ALL
R

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32-33-09
Page 403/404
Dec 15/93



NOSE LANDING GEAR EXTENSION AND RETRACTION
DESCRIPTION AND OPERATION

1. General

Nose landing gear (NLG) extension and retraction is accomplished simultaneously with the main landing gear (MLG) during all normal cycling. The major components of the NLG extension and retraction system located in zone 711 are:

- A retract actuator
- Jury brace link
- Jury brace crank
- Jury brace stabilizer

Also included as part of the system, but not attached to the NLG, is the uplock assembly in zone 114. The retract actuator transmits the force to extend or retract the nose gear through the jury brace link, jury brace crank, and the jury brace stabilizer.

2. Operation

The NLG operates simultaneously during extension or retraction cycles with the MLG upon command from either pilot through selective movement of the control switch lever on the pilots center instrument panel, zone 210. When the landing gear control is placed in the UP position, the landing gear selector valve directs pressure to the NLG uplock and retract actuators. Hydraulic pressure directed to the piston end (bottom) of the retract actuator extends the piston, which provides the force to rotate the jury brace. This action causes the jury brace to fold in the center and rotate downward.

Folding of the jury brace results in center folding of the upper and lower drag brace assemblies, and allows the landing gear to swing forward. Continued extension of the retract actuator forces the landing gear all the way up into the wheel well to engage the uplock.

R Hydraulic pressure applied to the rod end of the uplock actuator
R supplies force to retract the uplock actuator piston, which
permits the uplock latch to rotate to the locked position. Both
sets of doors are pulled closed behind the shock strut by the
rods attaching the doors to the upper drag brace.

EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL

R During the gear-down cycle, system C hydraulic pressure is applied simultaneously to the NLG uplock and retract actuators. This action releases the uplock latch and extends the gear in the following sequence:

- R
- (1) The uplock latch releases and the landing gear starts to move downward. Mechanical linkage between the doors and the landing gear pushes the doors open ahead of the landing gear.
 - (2) Pressure applied to the top (rod) end of the retract actuator applies the force to continue landing gear movement to the down-and-locked position. During the last part of landing gear travel, the door linkage reverses travel of the forward doors to close them. The aft nose doors remain open.
 - (3) The landing gear continues to the down-and-locked position.

3. Nose Landing Gear Retract Actuator

A. Description

The major components of the actuator (Ref. Fig. 1) are:

Actuator cylinder
Spherical bearing
Piston
Snubber valve
Rod end
Spherical ball
Shuttle valve
Relief valve

The piston, which is installed in the cylinder, is supported at one end by the cylinder and at the other end by a gland bearing. Integrally machined piston lands fit against the cylinder inside diameter to form two fluid cavities. Each cavity opens to a port in the cylinder. A piston ring and a seal are installed between the lands to prevent internal leakage between the cavities while the piston slides in the cylinder. A seal, packings, and backup rings prevent external leakage. A scraper is installed between the gland

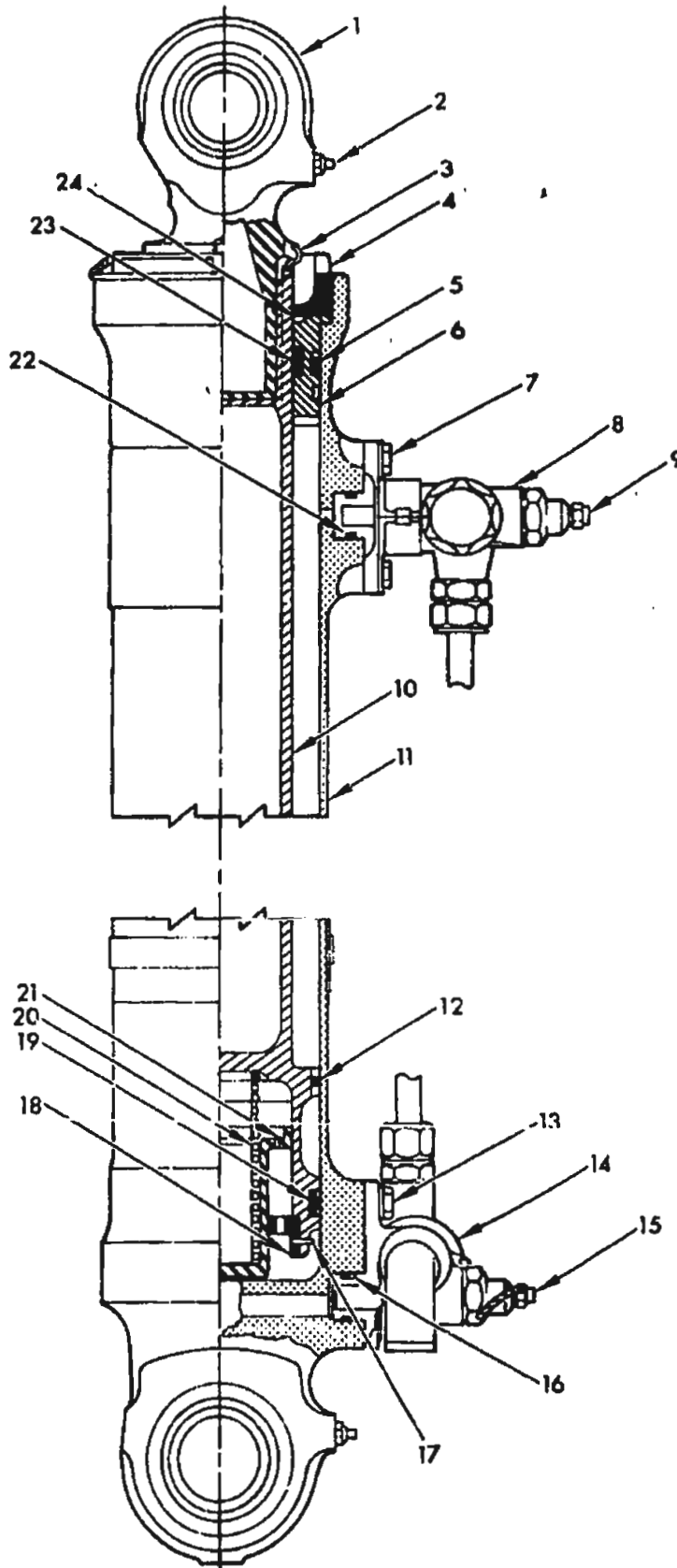
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32-34-00

Page 2
May 15/73

LOCKHEED
MAINTENANCE MANUAL



- 1 TERMINAL ASSEMBLY
- 2 GREASE FITTING (2 PLACES)
- 3 LOCKRING
- 4 NUT
- 5 PACKING
- 6 BEARING
- 7 BOLT (4 PLACES)
- 8 SHUTTLE VALVE
- 9 BLEEDER VALVE
- 10 PISTON
- 11 CYLINDER
- 12 PISTON RING
- 13 BOLT (4 PLACES)
- 14 RELIEF VALVE
- 15 BLEEDER VALVE
- 16 PACKING
- 17 COTTER PIN
- 18 GUIDE
- 19 SEAL
- 20 SPRING
- 21 VALVE
- 22 PACKING
- 23 SEAL
- 24 SCRAPER

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**Nose Landing Gear Retract Actuator
Figure 1**

EFFECTIVITY: ALL

32-34-00
Page 3
Dec 1/71

LOCKHEED
MAINTENANCE MANUAL

bearing and gland nut to prevent dirt from entering the actuator during actuator piston retraction. A snubber valve is installed on one end of the piston and a rod end with spherical ball is installed at the opposite end of the piston.

The cylinder, which houses the piston, provides fluid passages and cavities for actuator operation. A spherical bearing is installed in the cylinder attaching end. A shuttle valve and a relief valve (Ref. Fig. 2) are mounted on the exterior surface of the cylinder to provide hydraulic flow to and from the actuator.

The shuttle valve is installed at the actuator retract port. The shuttle valve provides hydraulic fluid connections to the actuator through two ports. The ports are identified by the embossed letters DOWN and DOWN ALT.

The relief valve is installed at the actuator extend port. The relief valve provides hydraulic fluid connections to the actuator through three ports. The ports are identified by the embossed letters UP, DOWN ALT, and DOWN ALT. The DOWN ALT port of the shuttle valve and one of the DOWN ALT ports of the relief valve are interconnected by a tube.

B. Operation

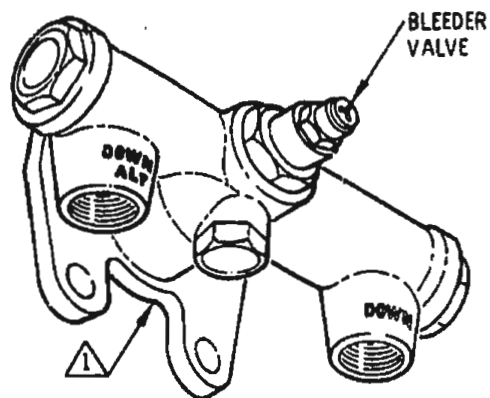
When pressure is applied to the shuttle valve DOWN port, the shuttle closes the DOWN ALT port and hydraulic fluid flows through the restrictor portion of the shuttle valve. Hydraulic pressure acting on a piston land causes the piston to retract. When the piston retracts, fluid trapped between the piston land and the blind cylinder end is forced through the restrictor portion of the relief valve and out the UP port. The restrictor portions of the two valves control the speed of piston retraction.

The snubber valve cushions the piston as it reaches the fully retracted position. The relief valve is set to open at a maximum pressure of 3700 pounds per square inch (psi) and to close at a minimum pressure of 3300 psi. Hydraulic fluid relieved through the relief valve flows through the DOWN ALT port.

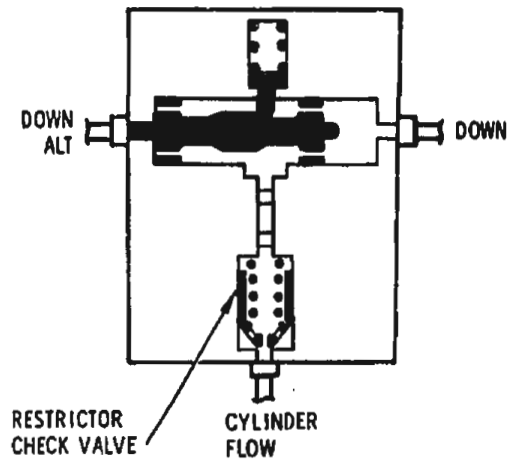
When pressure is applied to the shuttle valve DOWN ALT port, the operation is the same except that the shuttle closes the DOWN port.

When pressure is applied to the relief valve UP port, hydraulic fluid flows through the check valve portion of the relief valve. Hydraulic fluid acting on the piston land and the snubber valve causes the piston to extend. When the

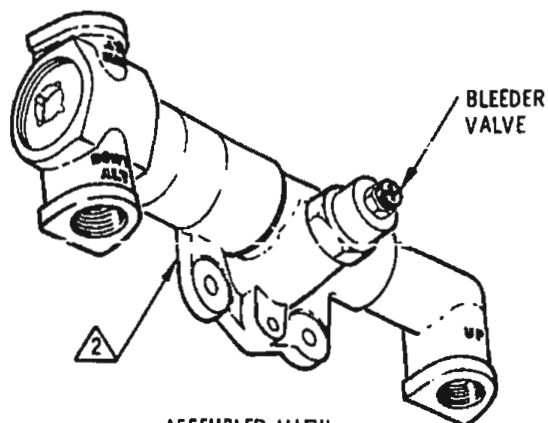
LOCKHEED
MAINTENANCE MANUAL



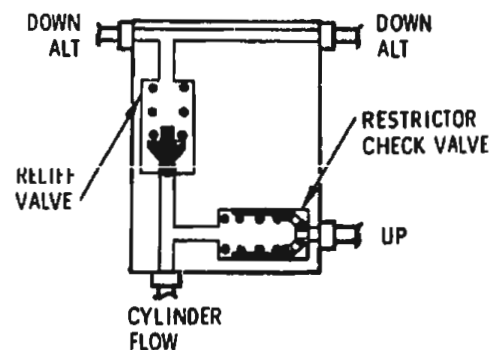
ASSEMBLED VIEW



SHUTTLE VALVE



ASSEMBLED VIEW



RELIEF VALVE

NOTE

- ① CYLINDER PORT HIDDEN
- ② CYLINDER PORT HIDDEN

Nose Landing Gear Actuator Valves
Figure 2

EFFECTIVITY: ALL

050

32-34-00
Page 5
Dec 1/71

HH 7128
MI-0100-32-162

LOCKHEED
MAINTENANCE MANUAL

piston extends, fluid trapped between the piston land and the cylinder rod end is forced through the check valve portion of the shuttle valve and the flow passes through the DOWN port or DOWN ALT port depending upon the port that was last pressurized.

4. Nose Landing Gear Uplock Assembly

A. Description

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The NLG uplock assembly is mounted on the bulkhead of FS 449 in zone 114. The uplock consists of a bracket, an uplock actuator, an uplock latch, a lever, two springs, and two interconnected links.

R

The uplock assembly functions during extension and retraction cycles by holding the NLG up and locked when retracted, and by releasing the uplock latch for the gear-down cycle.

R

The uplock actuator has three ports identified by the embossed letters DN, ALT DN, and UP.

B. Operation

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During the gear up cycle, pressure is applied to the uplock actuator up port, which causes the actuator piston to retract. Retraction of the piston, in turn, allows the forward and aft uplock links to move over center as the uplock latch is rotated during the gear-up swing. Cam action causes the uplock latch to rotate as the uplock roller contacts and moves upward into the uplock latch. During the final movement of the uplock roller into the uplock latch, the forward and aft uplock links move over center and lock the gear in the up position.

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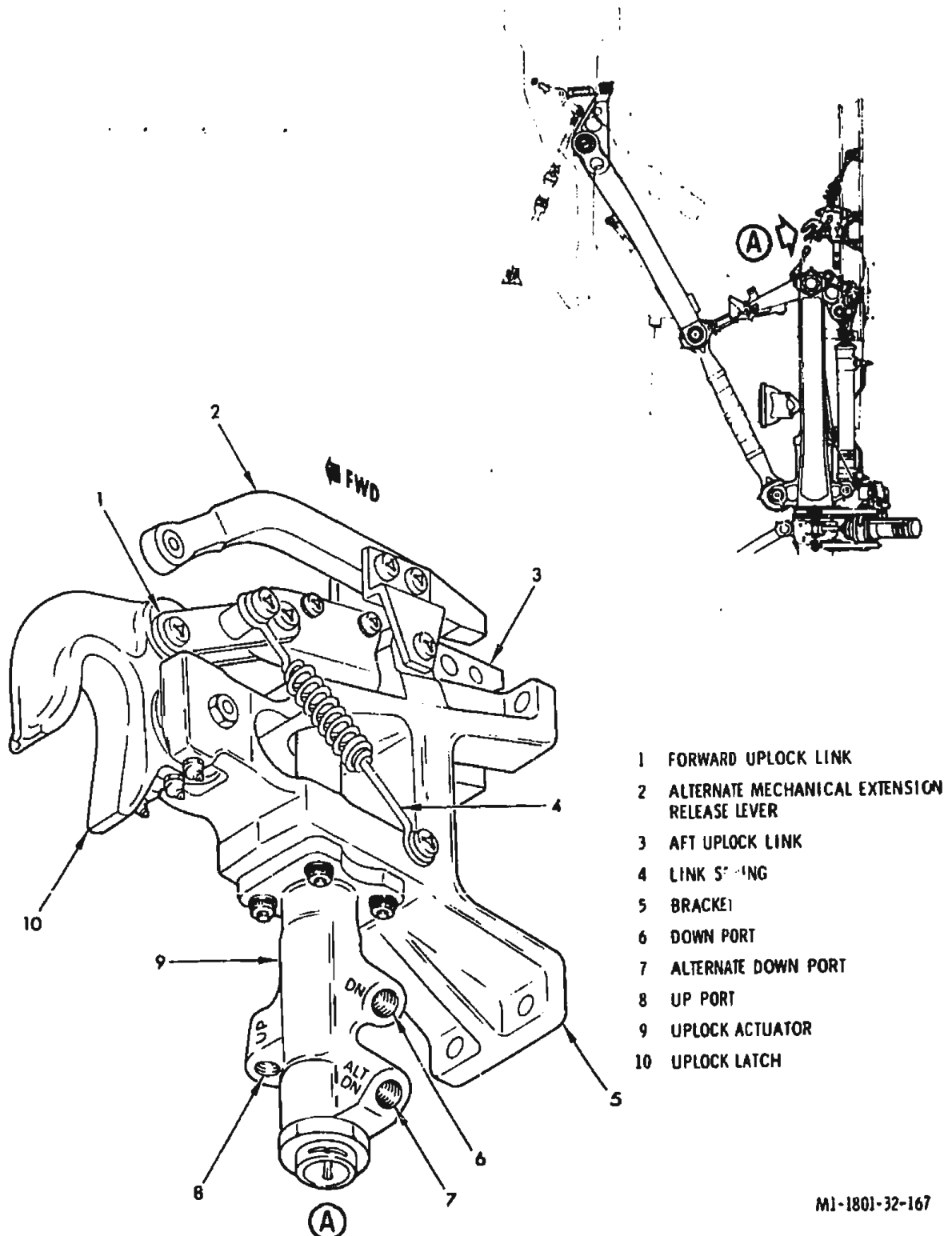
During the gear-down cycle when pressure is applied to the DN port, the actuator piston extends and pushes the forward and aft uplock links over center, again allowing the uplock latch to rotate and release the uplock roller.

EFFECTIVITY: ALL

32-34-00
Page 6
May 15/73

018B

LOCKHEED
MAINTENANCE MANUAL



Nose Landing Gear Uplock Assembly
Figure 3

EFFECTIVITY: ALL

32-34-00
 Page 7/8
 May 15/73

018B



NOSE LANDING GEAR RETRACT ACTUATOR ASSEMBLY
REMOVAL AND INSTALLATION

1. Equipment and Materials

Cotter Pin, MS24665-153, or equivalent
Adapter, R45116T-0804, or equivalent
Adapter, R45116T-0606, or equivalent
O-ring, LS10116-4 (NAS1612-4), or equivalent
O-ring, LS10116-6 (NAS1612-6), or equivalent
Grease, MIL-G-21164, or equivalent

2. Referenced Procedures

29-11-00 Hydraulic Power System - Maintenance Practices
32-30-00 Landing Gear Retraction and Extension - Adjustment
and Test

3. Removal/Installation

A. Removal

- (1) Verify that hydraulic system C pressure is zero psi (Ref. 29-11-00).
- (2) Using bleed valves on shuttle and relief valves, bleed off any residual hydraulic pressure (Ref. Fig. 401).
- (3) Disconnect hydraulic lines from shuttle and relief valves.
- (4) Remove nuts, washers, caps, and bolts securing actuator upper and lower attaching pins.
- (5) Remove lower attaching pin.
- (6) Support actuator and remove upper attaching pin.
- (7) Remove actuator.

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NOTE: Salvage nylon washers next to actuator end bearings for reuse.

EFFECTIVITY: ALL

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32-34-01
Page 401
Mar 15/84



- (8) Remove hydraulic line adapters and O-rings. Discard O-rings.

B. Installation

- (1) Inspect removed hydraulic line adapters for damage. Install new O-rings and insert adapters into ports.
- (2) Position actuator and install upper and lower attaching pins.

NOTE: Assure that the nylon anti-rotation washers are installed next to the actuator end bearings, one on each side of each bearing.

- (3) Secure pins with bolts, washers, caps, and nuts, safety nuts with cotter pins.
- (4) Connect hydraulic lines to adapters.
- (5) Verify that bleed valves are closed.

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

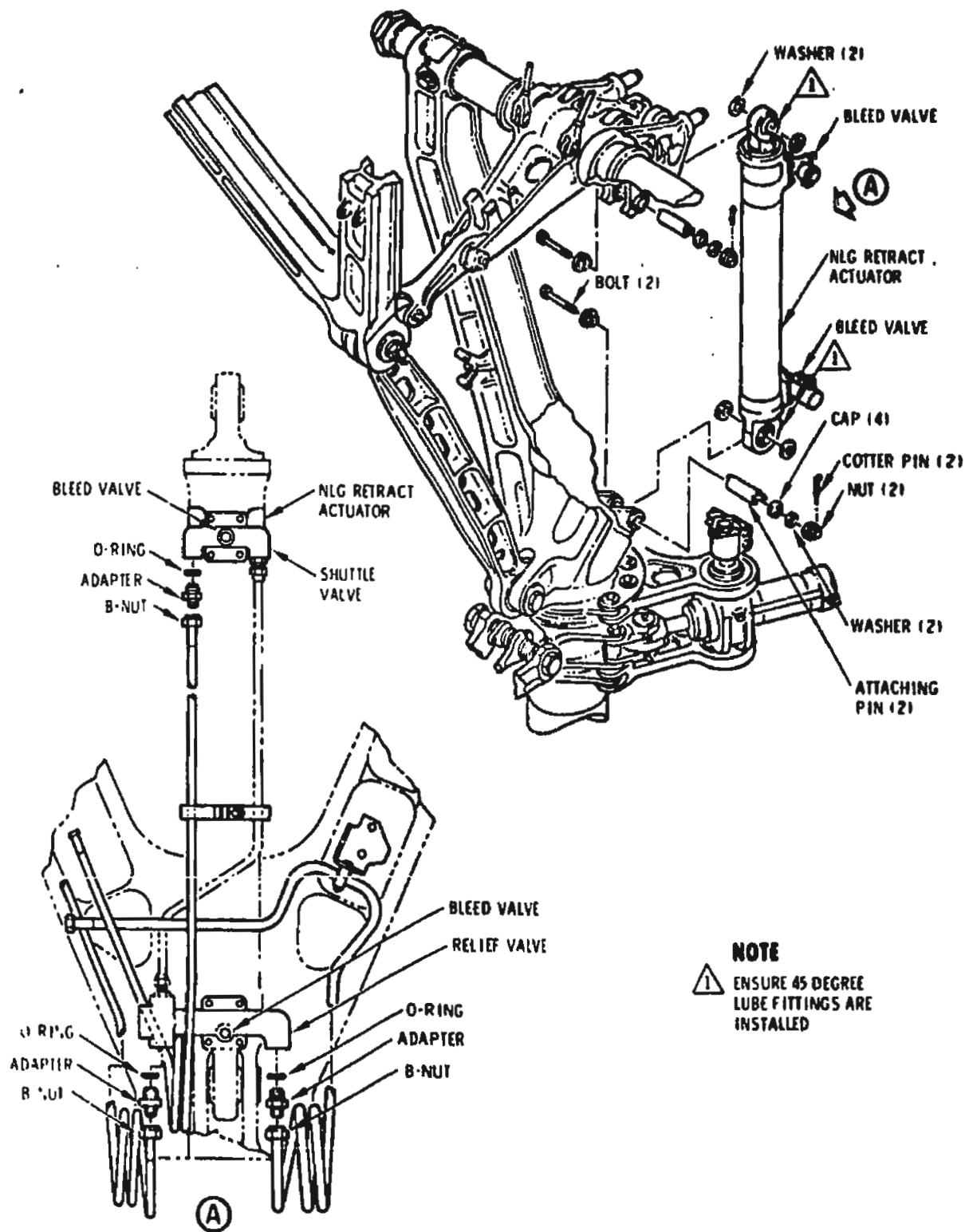
- (6) Turn on hydraulic system C pressure (Ref. 29-11-00).
- (7) Bleed air from bleed valves and check for leaks.
- (8) Perform nose landing gear test (Ref. 32-30-00).

EFFECTIVITY: ALL

001B

32-34-01
Page 402
Mar 15/84

LOCKHEED
MAINTENANCE MANUAL



Nose Landing Gear Retract Actuator Assembly
Removal and Installation
Figure 401

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32-34-01
Page 403/404
Aug 15/82

EFFECTIVITY: ALL

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NOSE LANDING GEAR ACTUATOR RELIEF VALVE
REMOVAL AND INSTALLATION

1. General

The nose landing gear retraction actuator retracts and extends the nose landing gear on the actuator is located a relief valve which provides controlled hydraulic flow to and from the actuator.

R 2. Equipment and Materials

R Sealing Compound, LAC Spec C-40-769, Type II or equivalent

R Protective Coating, Finch Paint and Chemical Co, Clear Epoxy
R 473-20 or Deft Inc, Clear Epoxy 01-X-20

R 3. Referenced Procedures

R 29-11-00 Hydraulic Power System - Maintenance Practices

R 4. Removal/Installation

A. Removal

- (1) Install nose landing gear safety pin.
- (2) Depressurize "C" system hydraulics (Ref. 29-11-00).
- (3) Loosen hydraulic line that is attached to the nose landing gear actuator relief valve (Reference Fig. 401).

WARNING: THE USE OF SAFETY EQUIPMENT IS HIGHLY RECOMMENDED WHEN WORKING WITH SKYDROL FLUIDS.

- (4) Remove the hydraulic line that is attached to the nose landing gear actuator relief valve (Reference Fig. 401).
- (5) Remove bolts (4) and washers (4) and remove the relief valve from the mounting pad on the cylinder.
- (6) Remove adapter and packing and packing and backup rings from the relief valve.
- (7) Plug the open ports.

EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL

B. Installation

- (1) Install backup rings and packing in packing groove.
- (2) Apply sealing compound to relief valve faying surfaces as follows:
 - (a) Clean valve and cylinder pad faying surfaces with a clean cloth dampened with cleaner trichloroethane or equivalent.
 - (b) Before cleaner air-dries, wipe treated surfaces with a clean, dry cloth.
 - (c) Apply a bead of sealing compound on valve or cylinder pad faying surfaces.
- (3) Place valve on cylinder mounting pad above cylinder closed end with valve ports facing cylinder opened end.
- (4) Install valve as follows:
 - (a) Clean washers and bolts with a clean cloth dampened with trichloroethane or equivalent.
 - (b) Brush washers and bolts with sealing compound and install valve with wet washers and bolts.
 - (c) Tighten and torque bolts to 70 to 100 pounds inch. Secure bolts with lock-wire.
 - (d) Remove extruded sealant with clean cloth dampened with trichloroethane or equivalent, but permit sealant ring to remain around base of each bolt head.
- (5) Apply protective coating on installed valve as follows:
 - (a) Clean sealed bolts and valve surfaces with a clean cloth dampened with trichloroethane or equivalent.
 - (b) Wipe treated area completely dry with a clean cloth before cleaner evaporates.
 - (c) Mix protective coating in accordance with manufacturers instructions.

NOTE: Allow 1/2 hour minimum drying time before applying protective coating over sealing compound.



MAINTENANCE MANUAL

- (d) Brush protective coating onto surface until a dry film 0.5 to 1.0 mil thick forms.
- (e) Ensure that protective coating covers sealing compound completely, overlapping adjacent area by at least 1/4-inch.
- (f) Allow protective coating to dry approximately 1/2-hour until tack-free before handling treated part.

NOTE: Determine that protective coating is free of pinholes, bubbles, voids, or orange skin appearance and adheres completely to surfaces.

- (g) Air-dry protective coating for 24 hours at 70 degrees Fahrenheit (21 degrees Centigrade) minimum or air-dry for 1 hour followed by 4 hours at 120 to 150 degrees Fahrenheit (49 to 66 degrees Centigrade).

NOTE: Drying process must be completed before exposing actuator to hydraulic fluid.

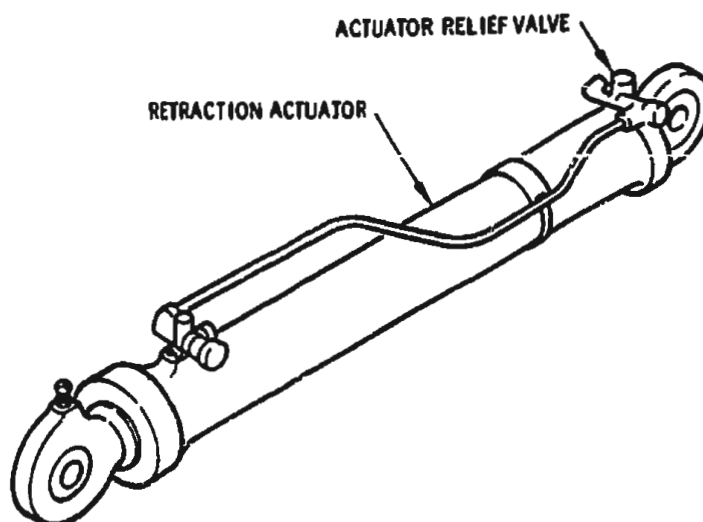
- (h) On actuator, install packings and plugs in DOWN ALT ports of relief valve and lock-wire together.
- (6) Install Tube.
- (a) Install transfer tube between relief valve and shuttle valve DOWN ALT ports as follows:

NOTE: On the actuator that has a restrictor valve, there is no transfer tube.
 - (b) Install packings on adapters and install adapters in relief valve and shuttle valve DOWN ALT ports.
 - (c) Install tube between adapters and tighten tube nuts.

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MAINTENANCE MANUAL



M1-0100-32-073

Nose Landing Gear Retraction Actuator
Figure 401

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EFFECTIVITY: ALL

32-34-02
Page 404
Feb 15/79



**NOSE LANDING GEAR ACTUATOR SHUTTLE OR RESTRICTOR VALVE
REMOVAL AND INSTALLATION**

1. General

The nose landing gear retraction actuator retracts and extends the nose landing gear. A shuttle valve or restrictor valve (depending on the dash number of the actuator) provides controlled hydraulic flow to and from the actuator (Ref. Fig. 401).

2. Equipment and Materials

CR Sealing Compound, PR1436GA 1/2, or equivalent.

3. Referenced Procedures

29-11-00 Hydraulic Power System - Maintenance Practices

4. Removal/Installation

The removal instructions are the same for the shuttle valve or the restrictor valve.

A. Removal

- (1) Install nose landing gear safety pin.
- (2) Depressurize "C" system (Ref. 29-11-00).
- (3) Remove the transfer tube from the shuttle valve and relief valve as follows:
 - (a) Disconnect nut on each end of tube and remove tube from between adapters installed in DOWN ALT ports of relief valve and shuttle valve.
 - (b) Remove adapters and packings.

NOTE: On the actuator, that has a restrictor valve, there is no transfer tube.

- (4) Plug open ports.
- (5) Remove shuttle valve or restrictor valve from actuator as follows:

EFFECTIVITY: ALL

001B

32-34-03
Page 401
May 15/87



- (a) Remove bolts and washers and remove shuttle valve from mounting pad on cylinder.
- (b) Remove packing and backup rings from shuttle valve.

B. Installation

Install restrictor valve or shuttle valve as follows:

- (1) Install backup rings and packing in packing groove.
- (2) Apply sealing compound to restrictor or shuttle valve faying surfaces as follows:
 - (a) Clean valve and cylinder pad faying surfaces with a clean cloth dampened with cleaner, trichloroethane or equivalent.
 - (b) Before cleaner air-dries, wipe treated surfaces with a clean, dry cloth.
 - (c) Apply a bead of sealing compound on valve or cylinder pad faying surfaces.
- (3) Place valve on cylinder mounting pad above cylinder open end with valve ports facing cylinder closed end.
- (4) Install valve as follows:
 - (a) Clean washers and bolts with a clean cloth dampened with trichloroethane or equivalent.
 - (b) Brush washers and bolts with sealing compound and install valve with wet washers and bolts.
 - (c) Tighten and torque bolts to 70 to 100 pounds inch. Secure bolts with lock-wire.
 - (d) Remove extruded sealing compound with a clean cloth dampened with trichloroethane or equivalent, but permit sealant ring to remain around base of each bolt head.
- CR (5) Deleted
- (6) Install tube between relief valve and shuttle valve DOWN ALT ports as follows:
 - (a) Install packings on adapters and install adapters in relief valve and shuttle valve DOWN ALT ports.

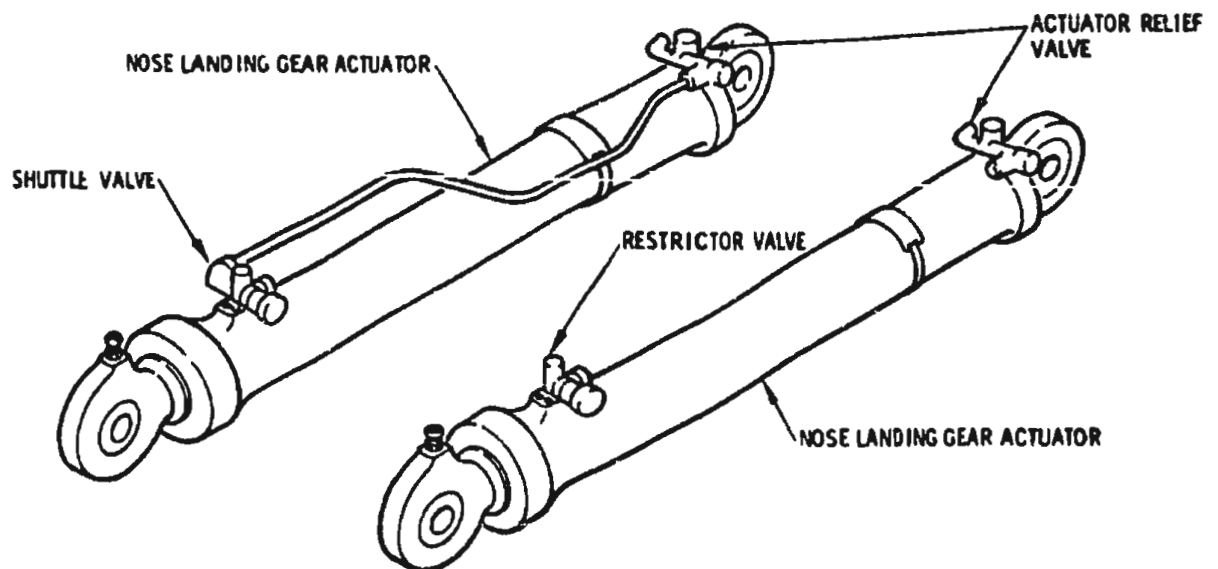
EFFECTIVITY: ALL

001B

32-34-03
Page 402
May 15/87

LOCKHEED
MAINTENANCE MANUAL

- (b) Install tube between adapters and tighten tube nuts.



M1-0100-32-872

Nose Landing Gear Retraction Actuator
Figure 401

R EFFECTIVITY: ALL
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001B

32-34-03
Page 403/404
May 15/87

**NOSE LANDING GEAR UPLOCK ACTUATOR - REMOVAL AND INSTALLATION****1. Equipment and Materials**

Hydraulic Fluid, LAC Spec C-34-1224, or equivalent

R Grease, Ref. MM 12-20-00, Lubrication, Scheduled Servicing

Environmental Seal, LAC Spec C-40-769, Type II (Products Research Co., PR 1301BT-K; Coast Proseal and Mfg. Co., No. 713), or equivalent

O-ring, NAS 1612-4, or equivalent

Adapter, R45116T0604, or equivalent

2. Referenced Procedures

7-11-00 Wing and Fuselage Jacking - Maintenance Practices

20-51-04 Environmental Sealing of Model L-1011 Airplane (P875-425)

24-00-00 Electrical Power - Maintenance Practices

29-11-00 Hydraulic Power System - Maintenance Practices

3. Removal/Installation**A. Removal**

- (1) Verify that hydraulic system C pressure is 0 psi (Ref. 29-11-00).
- (2) Loosen and disconnect hydraulic lines from actuator ports (Ref. Fig. 401).
- (3) Remove adapters and O-rings. Discard O-rings.
- (4) Install plugs in actuator ports and hydraulic line B-nuts to prevent contamination.
- (5) Support actuator and remove mounting nuts, washers, and bolts.
- (6) Remove actuator.

B. Installation

EFFECTIVITY: ALL

001B

32-34-04
Page 401
Dec 15/93



MAINTENANCE MANUAL

- (1) Apply a film of grease to actuator piston end and slide surface, and inside diameter of actuator assembly piston bearing.
- (2) Coat threads of mounting bolts with environmental seal (Ref. 20-51-Q4).
- (3) Position actuator in place and secure to uplock assembly with bolts, washers, and nuts (Ref. Fig. 401).
- (4) Inspect hydraulic port adapters for damage. Replace as required.
- (5) Coat O-rings with hydraulic fluid and install on port end of adapters.
- (6) Install adapters into actuator ports.
- (7) Connect hydraulic lines to adapters.
- (8) Verify that downlock safety pins are installed in all landing gear.
- (9) Open main landing gear inboard doors, tag handles to prevent stowing, and leave control handles in extended position.
- (10) Place jack under forward fuselage jack point (Ref. 7-11-00) so that jack is in contact with jack adapter.
- (11) Turn on electrical power (Ref. 24-00-00).

R

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (12) Ensure that LANDING GEAR control lever is in DOWN position.

R

WARNING: IF MLG INBOARD DOORS ARE OPEN AND NOT LOCKED, AND

EFFECTIVITY: ALL

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32-34-04
Page 402
Aug 15/81

LOCKHEED

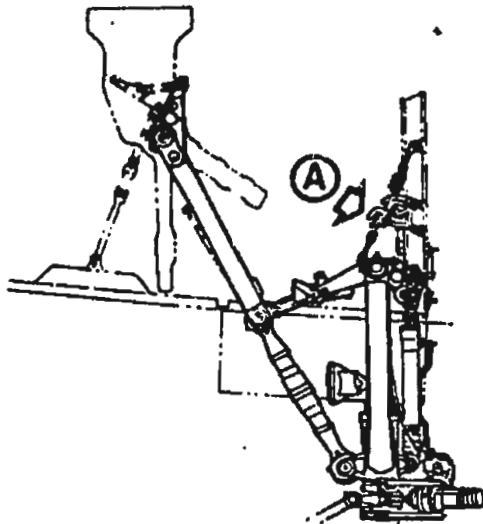


MAINTENANCE MANUAL

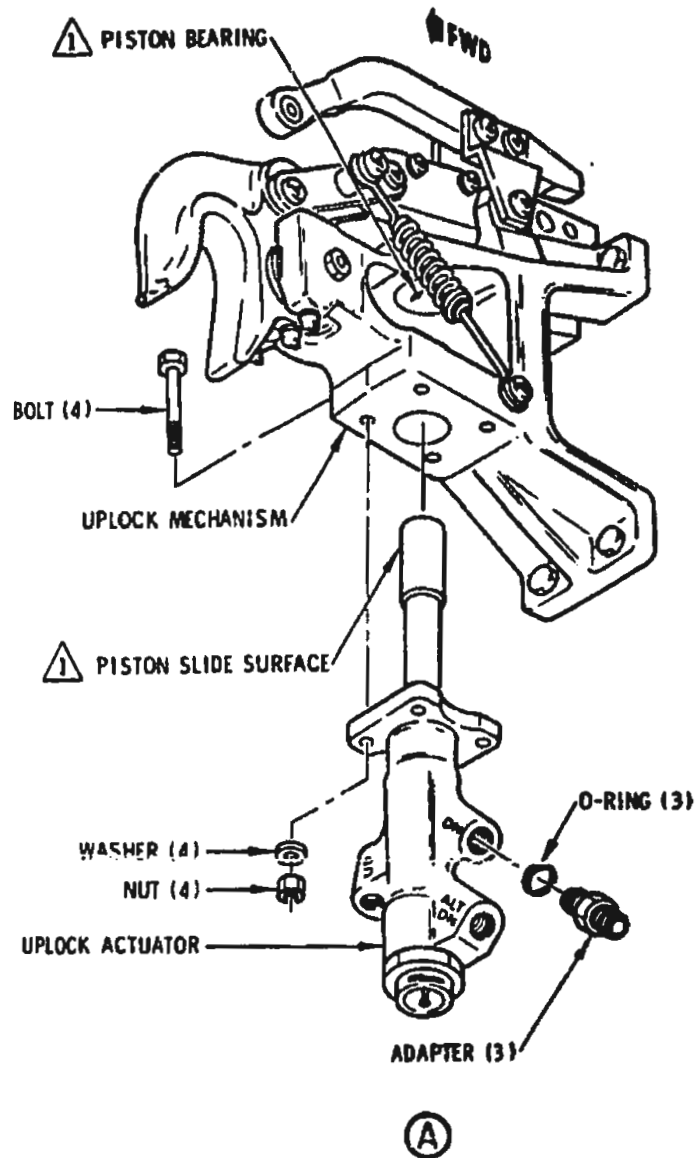
DOOR CONTROL HANDLE IS STOWED (UP), DOORS WILL CLOSE IF HYDRAULIC SYSTEM C PRESSURE IS TURNED ON. DOOR CONTROL HANDLES MUST BE EXTENDED AND TAGGED TO PREVENT DOOR CLOSING IF HYDRAULIC SYSTEM C PRESSURE IS TURNED ON.

- (13) Turn on hydraulic system C pressure (Ref. 29-11-00).
- (14) Check for hydraulic leaks.
- (15) Check operation of uplock actuator while cycling LANDING GEAR control lever to UP and DOWN positions.
- (16) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (17) Turn off electrical power as required (Ref. 24-00-00).
- (18) Remove forward fuselage jack (Ref. 7-11-00).
- (19) Close main landing gear inboard doors.

LOCKHEED
MAINTENANCE MANUAL



NOSE LANDING GEAR



NOTE

1 APPLY LIGHT COAT OF GREASE
PRIOR TO INSTALLATION

M1-0100-32-623

Nose Landing Gear Uplock Actuator - Removal and Installation
Figure 401

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001B EFFECTIVITY: ALL

32-34-04
Page 404
May 15/77

LOCKHEED
MAINTENANCE MANUAL

R NOSE_LANDING_GEAR_UNLOCK_ASSEMBLY_-_REMOVAL_AND_INSTALLATION

R 1. Equipment and Materials

R Grease, MIL-G-23827A, or equivalent

R 2. Referenced Procedures

R 7-11-00 Wing and Fuselage Jacking - Maintenance Practices.

R 12-24-31 Nose Landing Gear Doors Lubrication - Door
R Mechanism

R 24-00-00 Electrical Power - Maintenance Practices

R 29-11-00 Hydraulic Power System - Maintenance Practices

R 32-33-00 Main Landing Gear Inboard Door - Maintenance
R Practices

R 32-34-04 Nose Landing Gear Uplock Actuator - Removal and
R Installation

R 32-61-04 Nose Landing Gear Uplock Sensor - Adjustment and
R Test

R 3. Removal/Installation

R A. Removal

R **WARNING:** PRIOR TO REMOVAL, LANDING GEAR CONTROL LEVER MUST
R BE IN DOWN POSITION AND ALL THREE DOWNLOCK SAFETY
R PINS MUST BE INSTALLED.

- R (1) Remove bolts securing nose landing gear (NLG) sensor to
R uplock assembly (Ref. Fig. 401).
- R (2) Hold shims in position and secure to sensor with wire
R or tape.
- R (3) Secure sensor and conduit away from work area.
- R (4) Disconnect cable and pulley assembly from uplock
R assembly unlock arm.
- R (5) Disconnect spring assembly from unlock arm.
- R (6) Remove NLG uplock actuator (Ref. 32-34-04).

R EFFECTIVITY: ALL

001B

32-34-05
Page 401
Nov 15/77

LOCKHEED
MAINTENANCE MANUAL

- (7) Remove mounting bolts and remove uplock assembly.

B. Installation

- (1) Position uplock assembly in place and secure with bolts, washers, and nuts (Ref. Fig. 401).
- (2) Install uplock actuator (Ref. 32-34-04).
- (3) Apply a thin film of grease to bolt and install spring assembly. Secure with washer and nut.
- (4) Apply a thin film of grease to bolt and install cable and pulley assembly. Secure with washer and nut.
- (5) Position uplock sensor and secure with bolts and nuts. Shims must be installed in same position from which they were removed.
- (6) Pressure lubricate uplock assembly (Ref. 12-24-31).

NOTE: During the NLG retraction and extension, operation of the sensor should be observed. In the event the IN TRANS light is not going out when the NLG is in the retracted position, perform the adjustment procedures contained in 32-61-04 Adjustment and Test.
- (7) Jack aircraft at forward fuselage jack point (Ref. 7-11-00).
- (8) Verify that main landing gear wheels are chocked and chain binders are installed, and all downlock safety pins are in downlocks.
- (9) Ensure that flight station LANDING GEAR control lever is in DOWN position.
- (10) Turn on electrical power (Ref. 24-00-00).

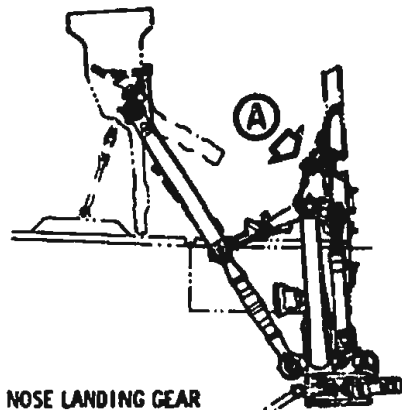
- R **WARNING:** VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:
- LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.
- PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.
- THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

EFFECTIVITY: ALL

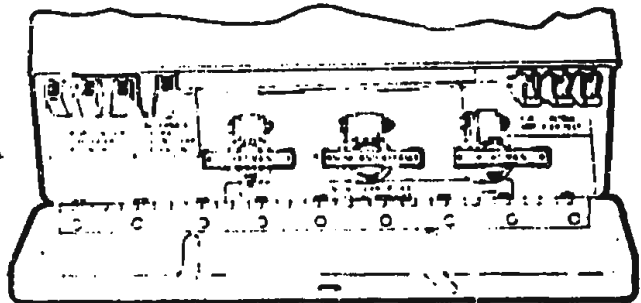
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32-34-05
Page 402
Aug 15/81

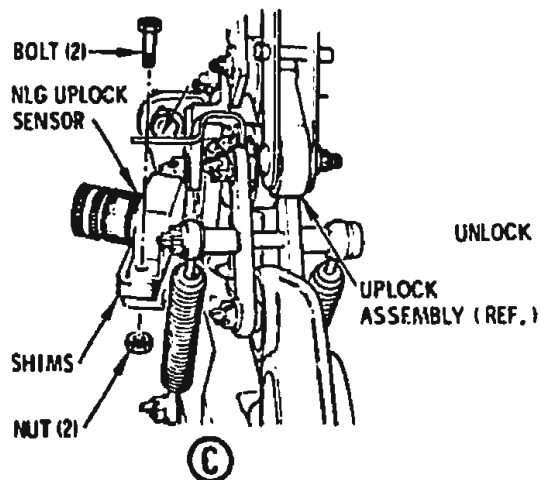
LOCKHEED
MAINTENANCE MANUAL



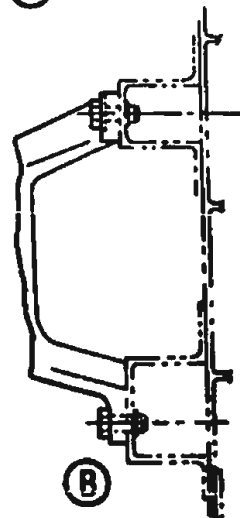
NOSE LANDING GEAR



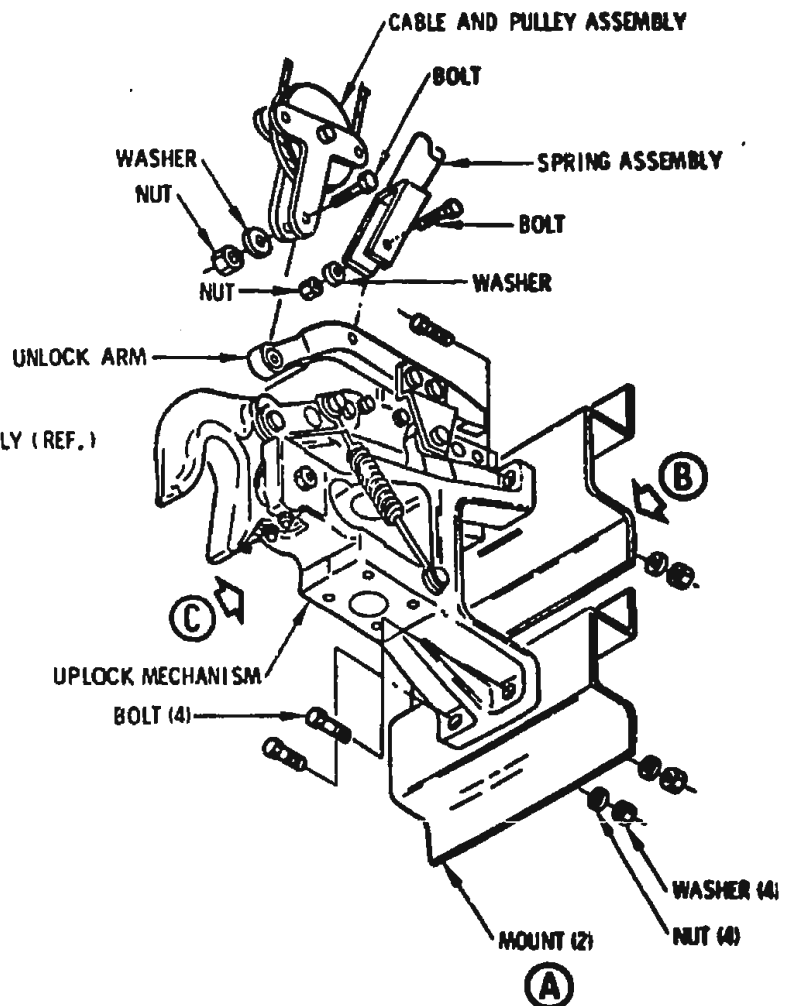
LANDING GEAR ALTERNATE EXTENSION CONTROLS



(C)



(B)



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Nose Landing Gear Uplock Assembly - Removal and Installation
Figure 401

EFFECTIVITY: ALL

001B

32-34-05
Page 403
Feb 15/78



- (11) Turn on hydraulic system C pressure (Ref. 29-11-00).
- (12) Remove NLG downlock safety pin.
- (13) Position LANDING GEAR control lever to UP. NLG must retract and lock in the up position.
- (14) Position LANDING GEAR control lever to NEUTRAL. NLG must remain locked up.
- (15) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (16) Position LANDING GEAR control lever to DOWN.
- (17) Verify that alternate brake system pressure accumulator is fully charged.
- (18) Position ALTERNATE HYDRAULIC LANDING GEAR EXTENSION switch to ALTN. NLG must be released from uplock and extend (Ref. Fig. 401).
- (19) Position switch to NORMAL.
- (20) Turn on hydraulic system C pressure (Ref. 29-11-00).
- (21) Position LANDING GEAR control lever to UP. Verify that gear is up and locked. Position lever to NEUTRAL.
- (22) Turn off hydraulic system C pressure.
- (23) Position LANDING GEAR control lever to DOWN.
- (24) Pull NOSE & BYPASS T-handle to stop (Ref. Fig. 401).
NOTE: NLG may not extend completely to locked-down position.
- (25) NLG must unlock and extend.
- (26) Release NOSE & BYPASS T-handle by rotating 90 degrees and pushing in until stopped. Rotate T-handle in opposite direction until it retracts into normal stowed position.
- (27) Verify that landing gear control module manual bypass valve (hydraulic service center) has returned to original (retracted) position.
- (28) Turn on hydraulic system C pressure (Ref. 29-11-00). If not locked down, NLG will do so.
- (29) Position LANDING GEAR control lever to UP.

EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL

- (30) Position control lever to DOWN. Landing gear must unlock and extend.
- (31) Verify that NLG is down and locked.
- (32) Install NLG downlock safety pin.
- (33) Turn off hydraulic system C pressure as required (Ref. 29-11-00).
- (34) Turn off electrical power as required (Ref. 24-00-00).
- (35) Lower and remove forward fuselage jack (Ref. 7-11-00).

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EFFECTIVITY: ALL

32-34-05
Page 405/406
Feb 15/78

LOCKHEED
MAINTENANCE MANUAL

NOSE LANDING GEAR JURY BRACE ACTUATOR CRANK ASSEMBLY
REMOVAL AND INSTALLATION

1. Equipment and Materials

- Cotter Pin, MS24665-153, or equivalent
- R Grease, Ref. MM 12-20-00, Lubrication, Scheduled Servicing
- C-40-769 Low Adhesion Sealing Compound, or equivalent

2. Referenced Procedures

- 20-00-03 Sealing of Threaded Steel Joints for Corrosion
Protection - PB75-484
- 32-21-02 Nose Landing Gear Shock Strut Assembly - Removal
and Installation
- 32-30-00 Landing Gear Retraction and Extension - Adjustment
and Test

3. Removal/Installation

A. Removal

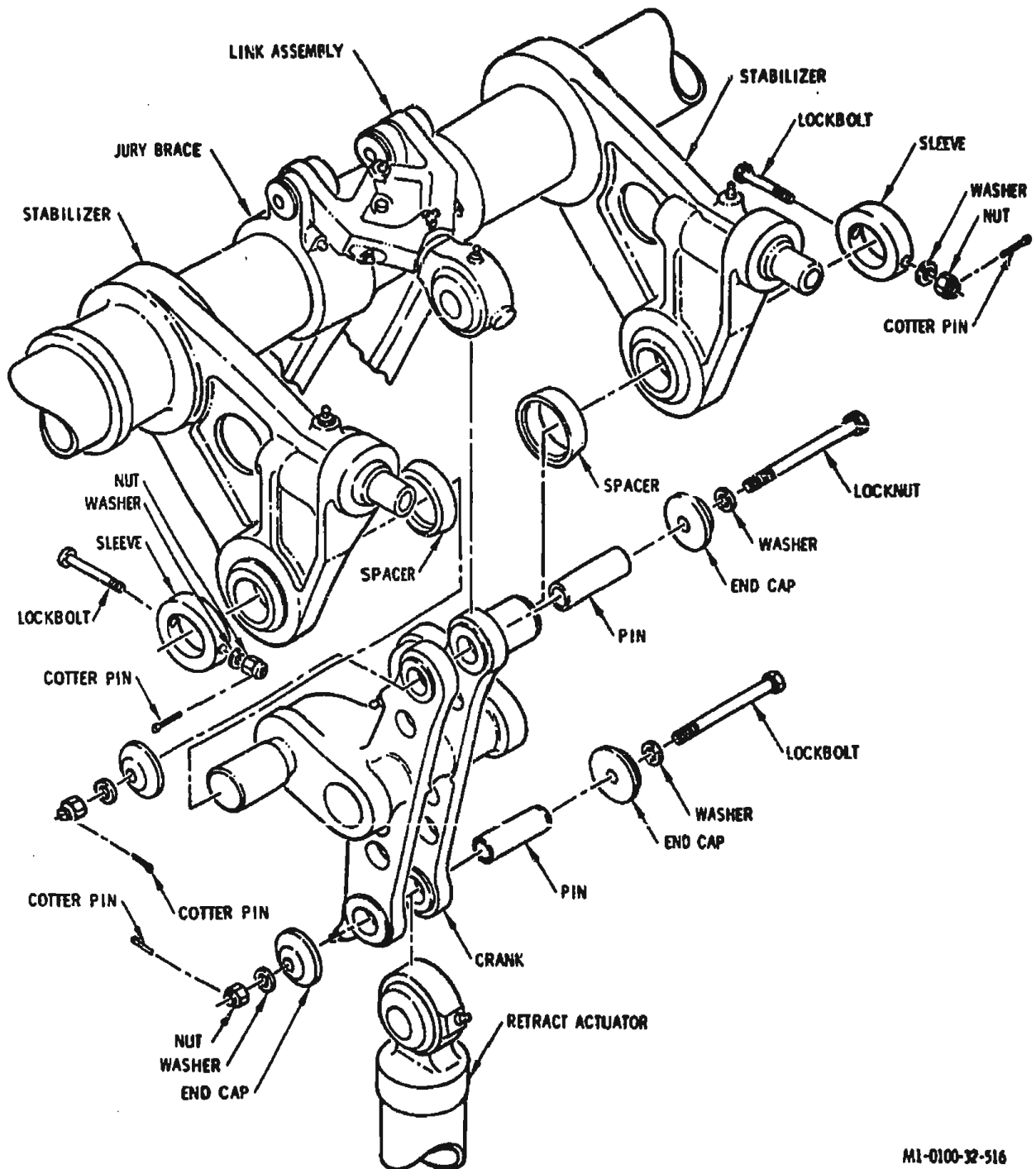
- (1) Remove nose landing gear (NLG) (Ref. 32-21-02).
- (2) Provide a means of supporting NLG in a steady position.
- (3) Remove thru-bolt and endcaps securing actuator-to-crank pin (Ref. Fig. 401).
- (4) Disconnect actuator from crank by removing pin. Secure actuator to strut.
- (5) Remove locking bolts and sleeves from crank shafts where shafts extend through both stabilizers.
- (6) Spread stabilizers apart far enough to free crank shafts from stabilizer bearings.
- (8) Remove spacers from crank shafts.
- (9) Disconnect crank from link assembly by removing pin.
- (10) Remove crank.

EFFECTIVITY: ALL

001B

32-34-06
Page 401
Dec 15/93

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-516

R
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Crank Assembly - Removal and Installation
Figure 401

EFFECTIVITY: 001-031 WITHOUT SB32-111

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32-34-06
Page 402
Feb 15/77



32-34-06
Page 403
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL

B. Installation

- (1) Coat both pins and crank shafts with grease.
- (2) With grease seals in position (Ref. Fig. 401), engage crank to link assembly and install pin.

NOTE: If not present when crank was removed,
installation of grease seals at this time
incorporates SB32-111.

- (3) Secure pin with endcaps, through-bolt, washers, and nut.
- (4) Safety nut with cotter pin and coat exposed bolt threads with sealing compound (Ref. 20-00-03).
- (5) Coat both faces of spacers with grease and install on crank shafts with larger OD toward crank.
- (6) Slide stabilizers along torque tube, over crank shafts, until stabilizers are snug against jury brace.
- (7) Coat one side of sleeves with grease and install on crank shafts with greased side against stabilizer bearings.
- (8) Secure sleeves to shafts with lock-bolts, washers, and nuts.
- (9) Safety nuts with cotter pins and coat exposed bolt threads with sealing compound (Ref. 20-00-03).
- (10) Install actuator to crank with pin; secure pin with lock-bolt, endcaps, washers, and nut.
- (11) Safety nut with cotter pin and coat exposed bolt threads with sealing compound (Ref. 20-00-03).
- (12) Lubricate all crank grease fittings with grease.
- (13) Install nose landing gear (Ref. 32-21-02).
- (14) Perform nose landing gear retraction and extension while checking for binding or interference (Ref. 32-30-00).

EFFECTIVITY: ALL

32-34-06
Page 404
Nov 15/77

001B

LOCKHEED
MAINTENANCE MANUAL

NOSE LANDING GEAR DOOR ACTUATION - DESCRIPTION AND OPERATION

1. General

R
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R The nose landing gear (NLG) doors are mechanically actuated through rods and link assemblies. The forward door rods are connected to two link assemblies which are, in turn, connected to the lugs on the upper drag brace. The aft door rods are connected directly to the upper drag brace (Ref. Fig. 1). A manual release mechanism is provided to open the forward left door and a quick release disconnect pin to open the right door.

2. Operation

R
R Extension of the landing gear opens both the forward and aft doors. The forward doors open as the gear extends. When the gear is clear of the doors, actuation of the forward drag brace, through linkage to the upper drag brace, closes the forward doors. The aft doors open as the gear extends and remain open until the gear is retracted. The forward doors are manually opened when the manual release lever is actuated or the quick release pin is disconnected. Actuation of the manual release lever moves the manual release arm (through cable action) releases the forward door rod manual release mechanism.

3. Nose Landing Gear Forward Door Rod Assembly

A. Description and Operation

R
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R A forward door rod assembly connects each forward door to a forward door link assembly (Ref. Fig. 2). The left door rod incorporates a mechanical release assembly which allows the rod to extend and the left door to open.

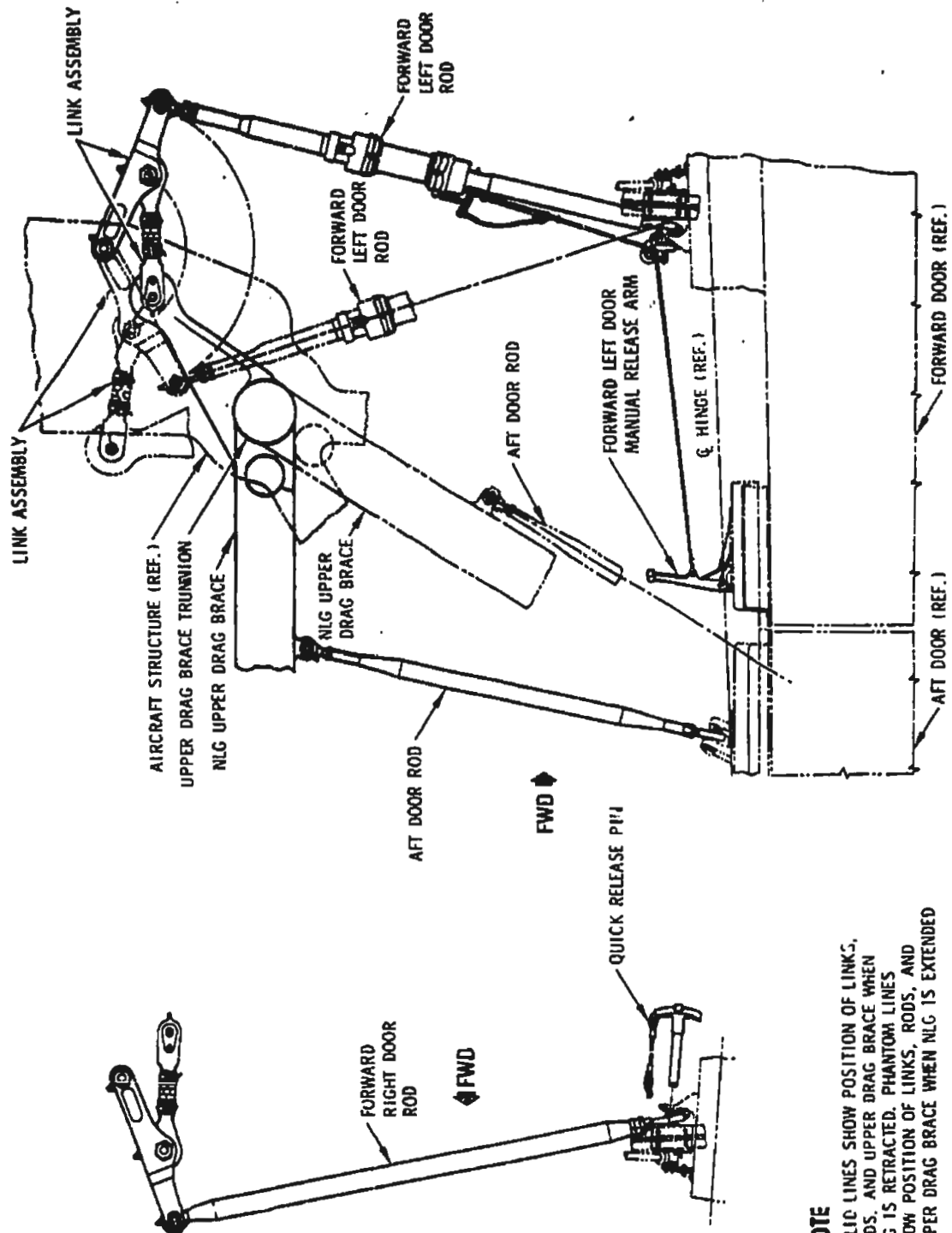
R
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R Actuation of the manual release lever moves the lever arm against the lever arm return spring. Internally, the lever arm moves the plunger against the plunger return spring. As the plunger is positioned to compress the spring, the reduced diameter of the plunger moves opposite the locking segments and releases them from the locked position. Tension on the rod assembly forces the locking segments into a reduced (unlock) diameter because of the ramped lock chamber. The unlocked rod is free to extend. The rod compresses when the door is closed. The locking segments are positioned outward by movement of the spring-loaded plunger. The rod is locked in a compressed condition. A quick release pin connecting the door rod to the door provides a means for opening the right door.

EFFECTIVITY: ALL

32-35-00
Page 1
Feb 15/74

LOCKHEED
MAINTENANCE MANUAL

M1-0101-32-174



NOTE
 SOLID LINES SHOW POSITION OF LINKS, RODS, AND UPPER DRAG BRACE WHEN NLG IS RETRACTED. PHANTOM LINES SHOW POSITION OF LINKS, RODS, AND UPPER DRAG BRACE WHEN NLG IS EXTENDED

Nose Landing Gear Door Actuation Linkage
 Figure 1

EFFECTIVITY: ALL

32-35-00

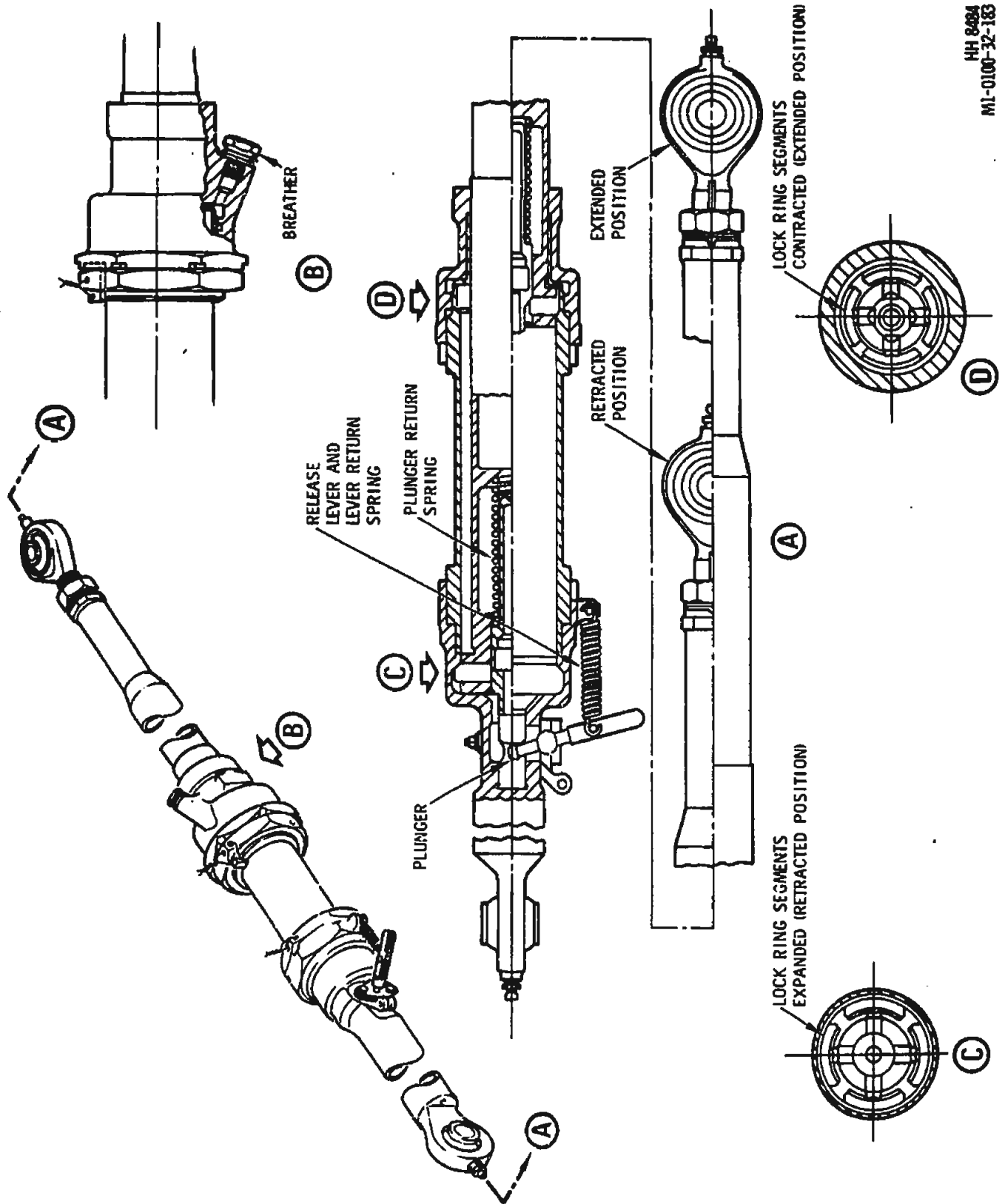
Page 2
 Feb 15/74

001B

LOCKHEED
MAINTENANCE MANUAL



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Nose Landing Gear Forward Left Door Rod Assembly
Figure 2

EFFECTIVITY: ALL

32-35-00
Page 3/4
Feb 15/74

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MAINTENANCE MANUAL

R NLG FORWARD DOOR ROD ASSEMBLY - REMOVAL AND INSTALLATION

R 1. Equipment and Materials

- R Cotterpin MS24665-149 or equivalent
- R Cotterpin MS24665-151 or equivalent
- R Cotterpin MS24665-153 or equivalent
- R Lock-wire, Fed. Spec. QQ-W-390, 0.032-inch diameter, or
R equivalent
- R Oil, Mil-H-6083 or equivalent

R 2. Referenced Procedures

- R 12-24-31 Nose Landing Gear Door Servicing
- R 32-22-01 Nose Landing Gear Forward Door - Adjustment and
R Test

R 3. Removal/Installation

R A. Preliminary Procedures

- R (1) Ensure landing gear control lever is in the DOWN
R position and tagged.
- R (2) Ensure downlock safety pins are installed.
- R (3) On aircraft 001-006,
R open both forward NLG doors by pulling manual release
R at rear of each door.
- R (3) On aircraft 007-999,
R open left forward NLG door by pulling manual release at
R rear of door. Open right forward NLG door by removing
R quick release pin.

R B. Removal (Left Door)

- R (1) Remove cotter pins and nuts from upper and lower door
R rod assembly retaining bolts.
- R (2) Remove cable release pulley assembly.
- R (3) Remove pin securing cable to spring release assembly.

R EFFECTIVITY: ALL

001B

32-35-01
Page 401
Nov 15/82



MAINTENANCE MANUAL

(4) Support door rod assembly. Remove upper and lower retaining bolts and washers.

(5) Remove door rod assembly.

C. Installation (Left Door)

(1) Position door rod assembly and install upper retaining bolt with washers.

(2) Install lower retaining bolt, washers, and cable release pulley assembly.

(3) Install upper nut and torque 175-190 lb.in. Back nut off sufficiently to install cotter pin. Install cotter pin.

(4) Install lower nut and torque 60-65 lb. in. Install cotter pin.

(5) Position cable to spring release assembly and install pin. Install cotter pin.

D. Removal (Right Door)

(1) On aircraft 001-006, procedure to remove right door rod assembly is identical to left door rod assembly.

(1) On aircraft 007-999, proceed as follows:

(a) Remove cotter pin and nut from upper door rod assembly retaining bolt.

(b) Support door rod assembly. Remove upper retaining bolt and washers.

(c) Remove door rod assembly.

E. Installation (Right Door)

(1) On aircraft 001-006, procedure to install right door rod assembly is identical to left door rod assembly.

(1) On aircraft 007-999, proceed as follows:

(a) Position door rod assembly and install upper retaining bolt and washers.

EFFECTIVITY: ALL

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32-35-01
Page 402
Nov 15/89

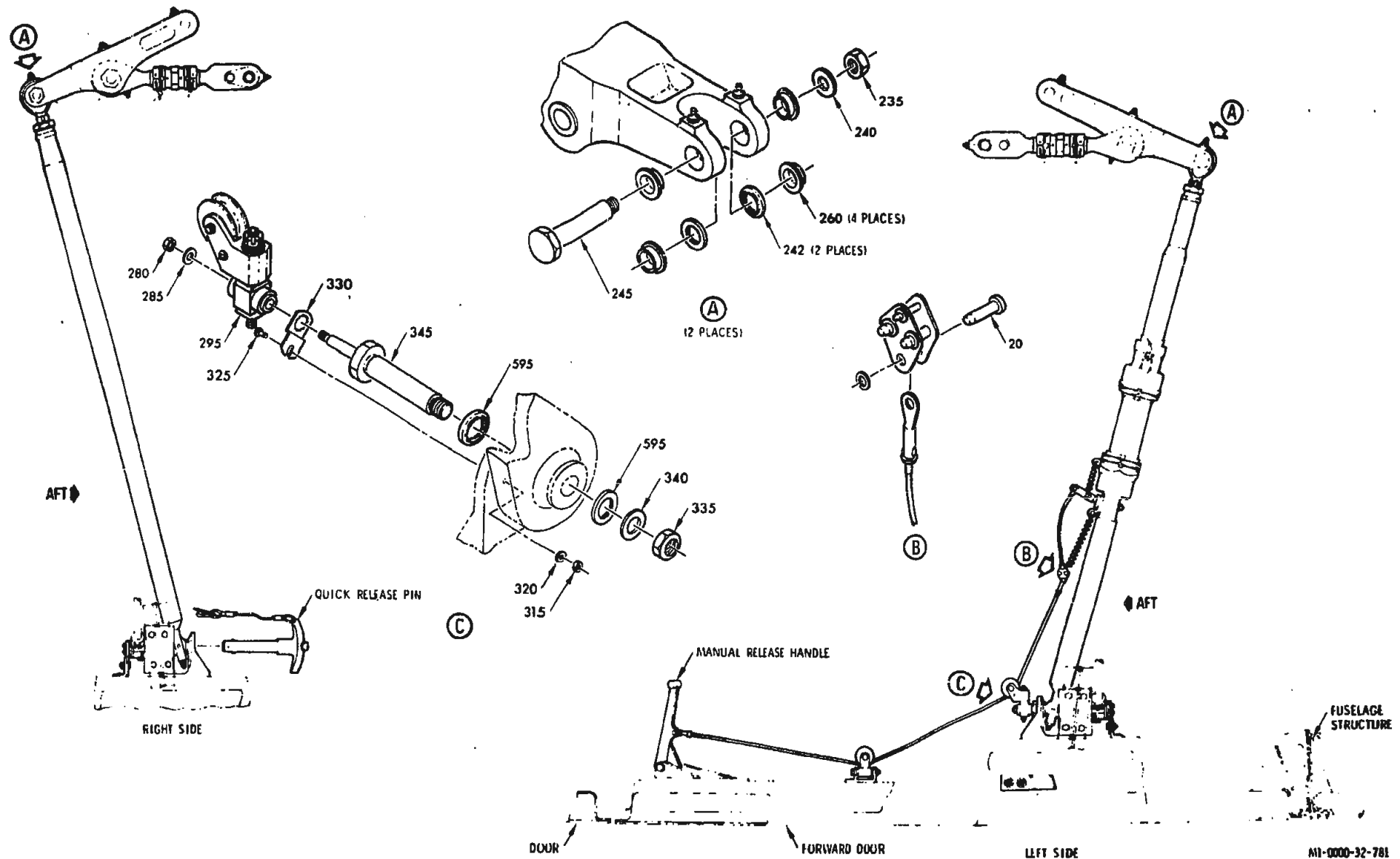


MAINTENANCE MANUAL

- (b) Install nut and torque 465-510 lb. in. Install cotter pin.

F. Finishing Procedures

- (1) Adjust forward NLG door (Ref. 32-22-01).
- (2) Service door rod assembly with oil as follows:
 - (a) Remove breather plug and packing.
 - (b) With rod assembly in its fully compressed and locked position, fill with oil.
 - (c) Manually cycle rod assembly to its fully extended position and then return to its fully compressed and locked position.
 - (d) If required, add oil to full capacity.
 - (e) Install plug and packing.
 - (f) Lockwire plug.
- (3) Lubricate door rod assembly (Ref. 12-24-31).
- (4) On aircraft 001-006,
close both forward NLG doors.
- (4) On aircraft 007-999,
close right forward NLG door and insert quick release pin. Close left forward NLG door.
- (5) Remove tag from landing gear control lever.



M1-0000-32-781

NLG Forward Door Rod Assembly - Removal and Installation
Figure 401

32-35-01
Page 405/406
Mar 15/83

EFFECTIVITY: ALL

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LOCKHEED
MAINTENANCE MANUAL

LANDING GEAR HYDRAULIC ALTERNATE EXTENSION SYSTEM
DESCRIPTION AND OPERATION

1. General

The landing gear hydraulic alternate extension system directs stored alternate brake system accumulator pressure to extend the landing gear if hydraulic system C pressure is lost.

In addition to the alternate brake system accumulator and hydraulic alternate extension motor operated valve (Ref. Fig. 1), the system also includes the following portions and components of the normal landing gear and alternate brake hydraulic systems:

- Nose landing gear (NLG) actuator and actuator shuttle valve
- NLG uplock
- Main landing gear (MLG) door uplock
- Bypass valve (in phase control module)
- MLG jury brace actuator and actuator shuttle valve
- Alternate brake and landing gear (system C) accumulator

2. Operation

The system is controlled with a guarded switch labeled ALTERNATE HYDRAULIC LANDING GEAR EXTENSION (Ref. Fig. 2). This switch is located on the aft left side of the pilots center console, zone 210. The switch controls the hydraulic alternate extension motor-operated valve (Ref. Fig. 3) located in the hydraulic service center, zone 147.

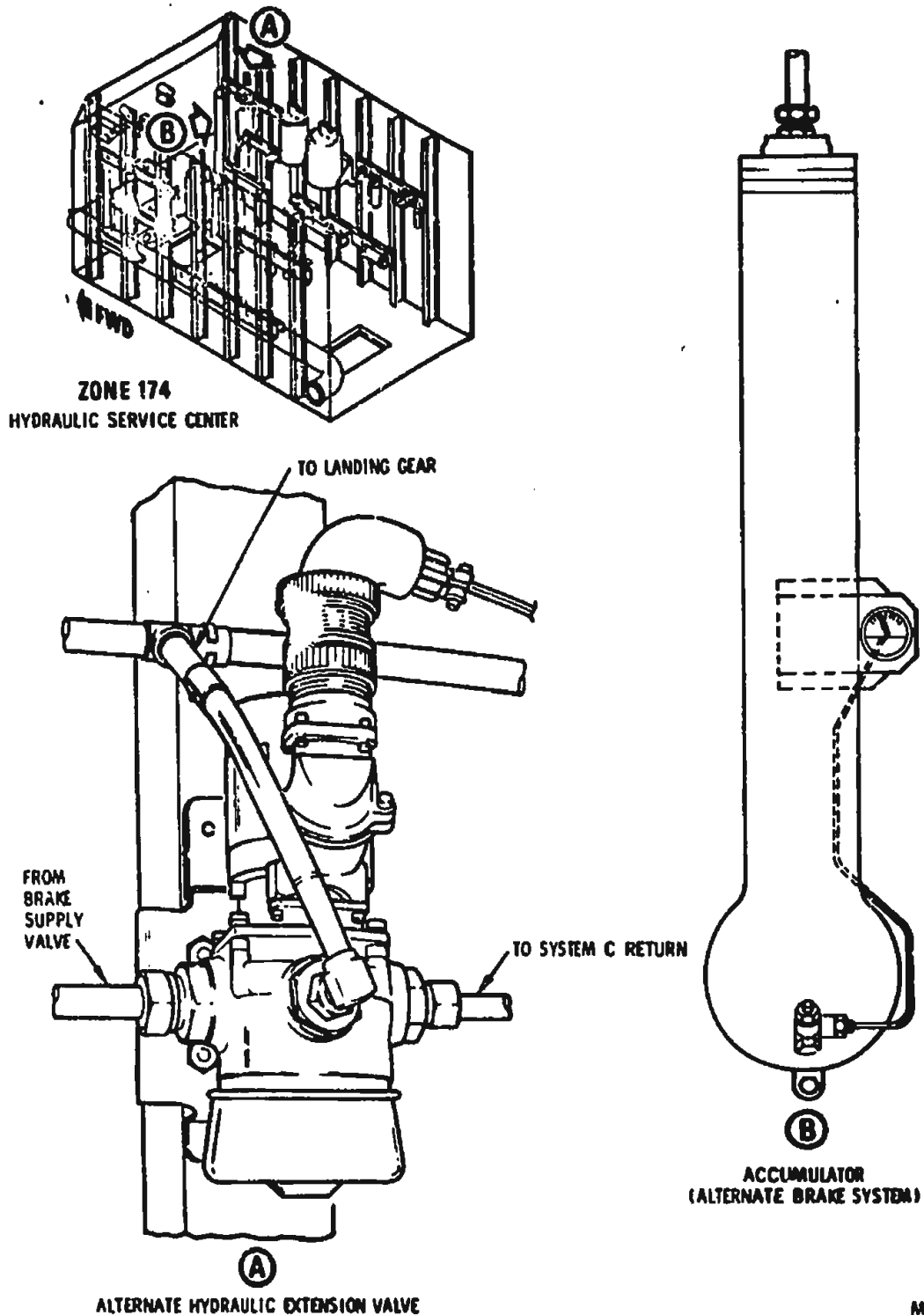
When the ALTERNATE HYDRAULIC LANDING GEAR EXTENSION switch is actuated during a loss of system C hydraulic pressure, the following events occur (Ref. Fig. 4):

- The motor-operated valve directs stored accumulator pressure into the landing gear hydraulic system.
- The MLG inboard door uplocks unlock.
- The NLG uplock unlocks.
- The bypass valves (in phase control modules) port fluid to the up and down side of MLG actuators.

EFFECTIVITY: ALL

32-36-00
Page 1
May 15/82

LOCKHEED
MAINTENANCE MANUAL



MI-1801-32-365

Hydraulic Alternate Extension System
Hydraulic Pressure Source Component Location
Figure 1

EFFECTIVITY: ALL

32-36-00
Page 2
May 15/77

001B

LOCKHEED
MAINTENANCE MANUAL

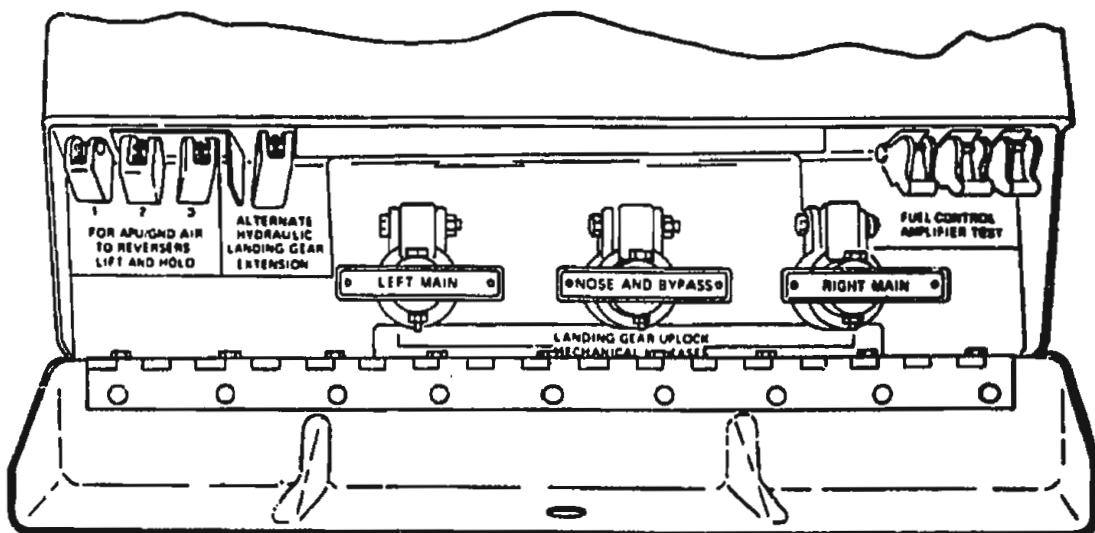
R All landing gears swing downward, regardless of gear handle position. The MLG jury brace actuators are pressurized to lock down.

The NLG retract actuator is pressurized to lock the gear down. The MLG inboard doors remain open.

3. Hydraulic Alternate Extension Valve

A. Description and Operation

The function of the hydraulic alternate extension valve (Ref. Fig. 5) is to withhold or direct stored accumulator hydraulic power for landing gear down operation. The valve is a three-way, two-position, motor-operated hydraulic valve. When no electrical signal is present, the valve is closed to inlet pressure, and the cylinder port is open to the return port.



MA 3716
M1-1000-37-267

**Landing Gear Hydraulic Alternate Extension Switch
Figure 2**

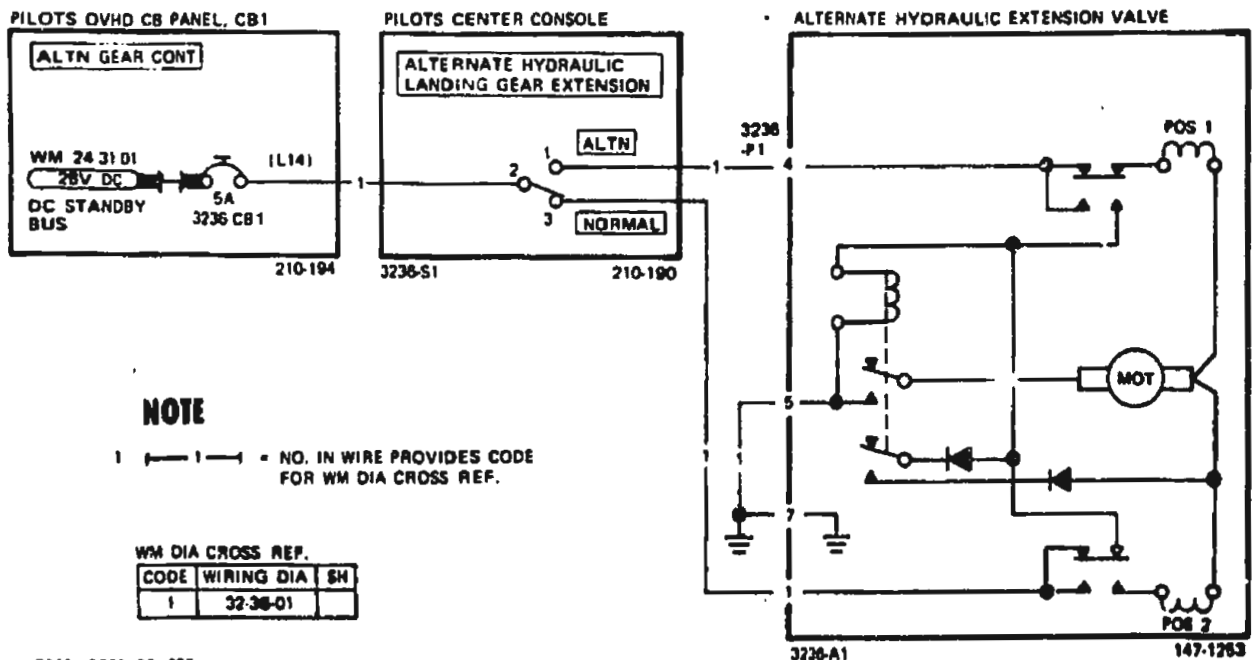
EFFECTIVITY: ALL

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32-36-00
Page 3
Nov 15/84

LOCKHEED

MAINTENANCE MANUAL

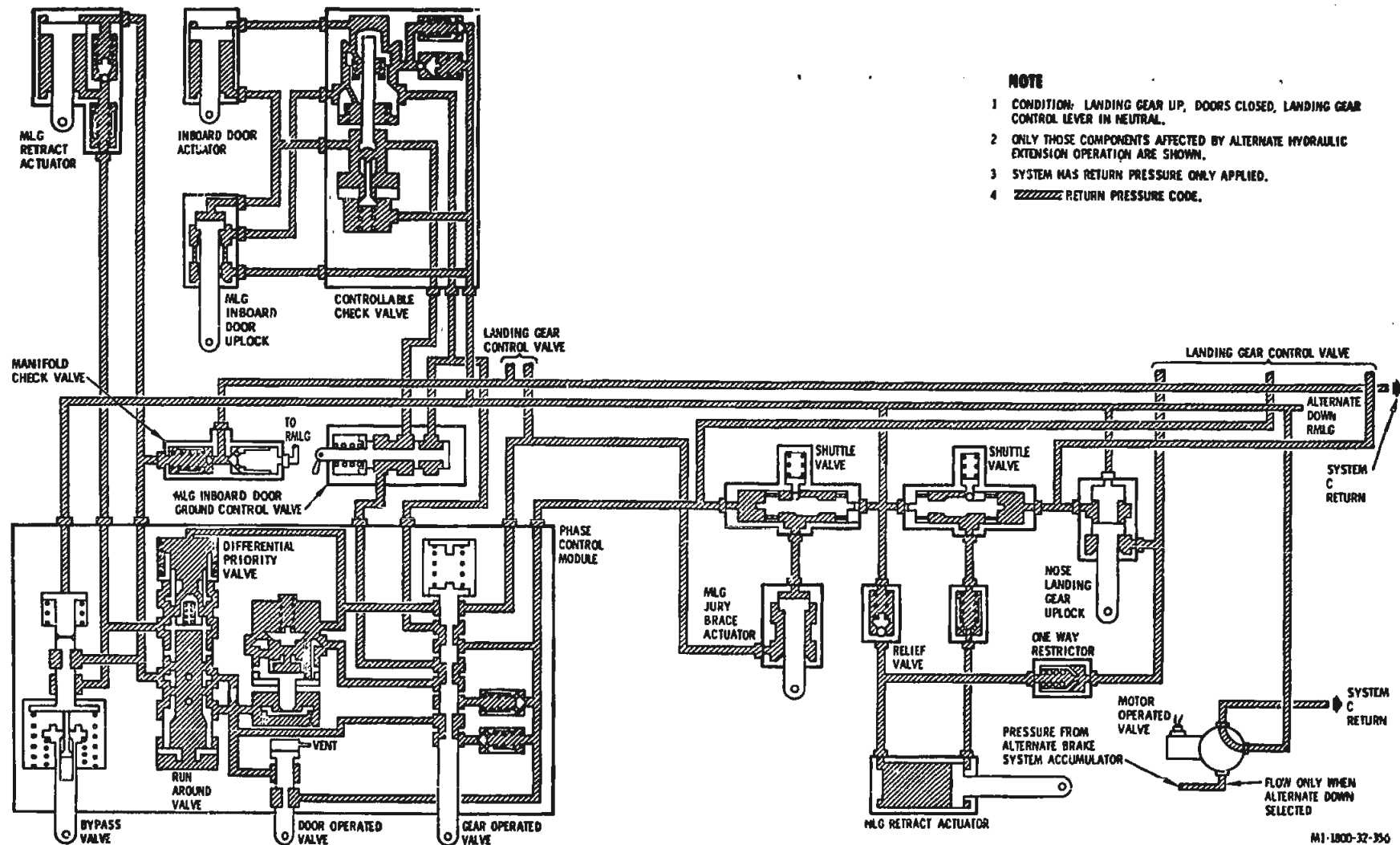


Landing Gear Hydraulic Alternate Extension System
Electrical Schematic
Figure 3

EFFECTIVITY: ALL

32-36-00
Page 4
Dec 15/80

001B



M1-1800-32-356

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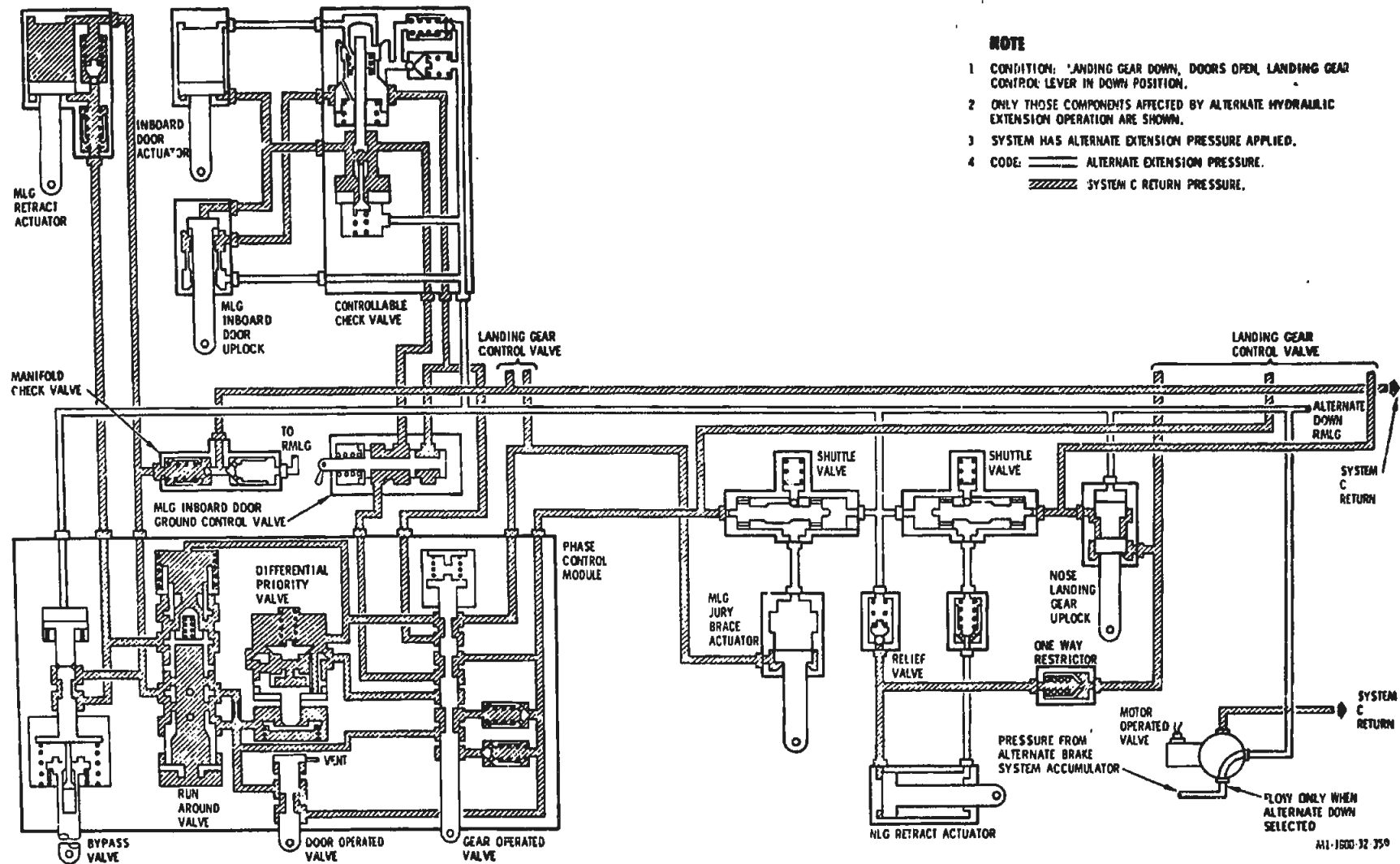
Landing Gear Hydraulic Alternate Extension Schematic
Figure 4 (Sheet 1)

EFFECTIVITY: ALL

32-36-00
Page 5/6
May 15/77

001B

LOCKHEED
MAINTENANCE MANUAL



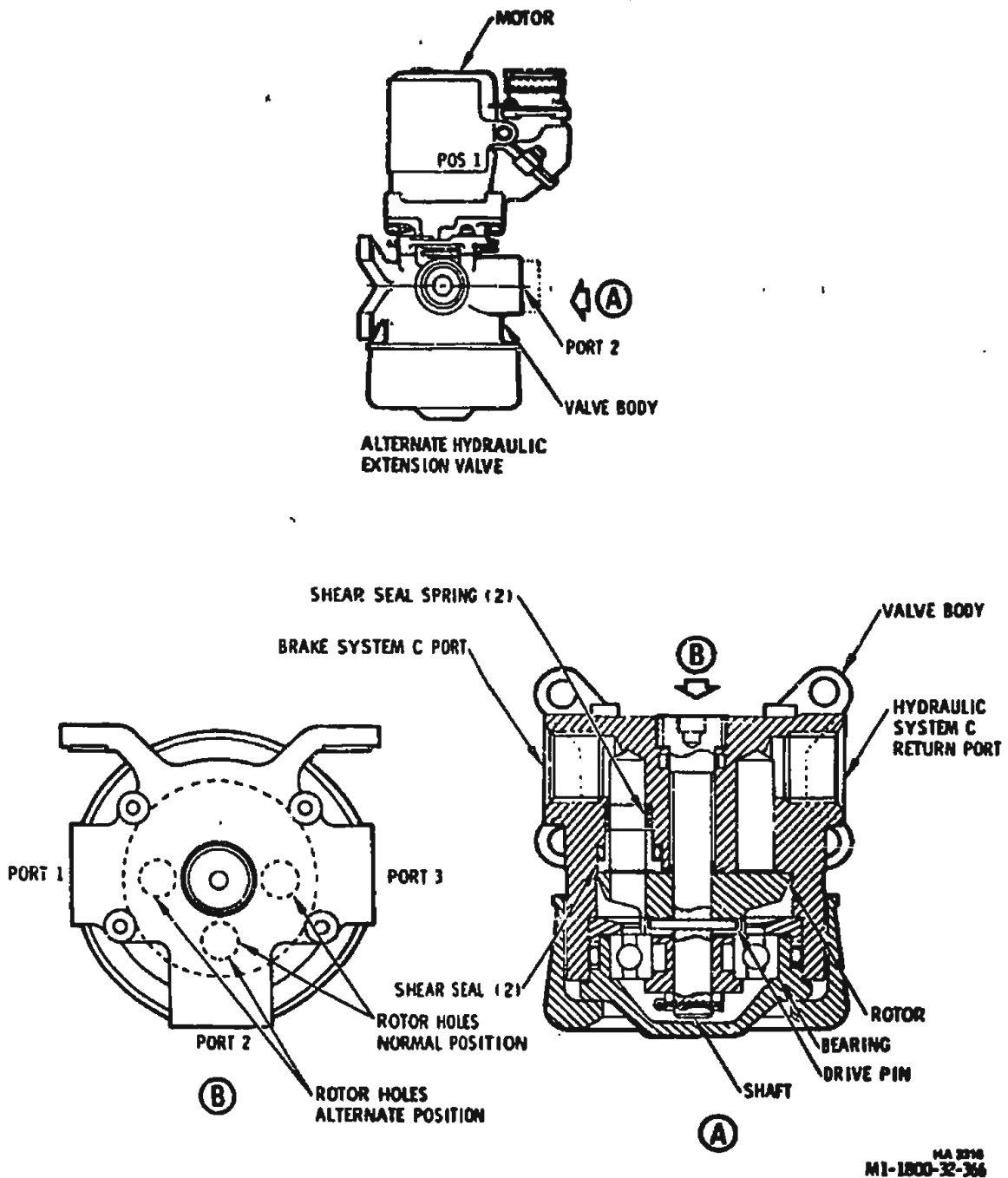
Landing Gear Hydraulic Alternate Extension Schematic
Figure 4 (Sheet 2)

EFFECTIVITY: ALL

32-36-00
Page 7/8
May 15/77

001B

LOCKHEED
MAINTENANCE MANUAL



Hydraulic Alternate Extension Valve
Figure 5

EFFECTIVITY: ALL

32-36-00
Page 9/10
May 15/77

001B

LOCKHEED
MAINTENANCE MANUAL

R LANDING GEAR HYDRAULIC ALTERNATE EXTENSION SYSTEM - FAULT ISOLATION

R 1. General

R Reference data and fault isolation procedures for
R troubleshooting landing gear system faults are included in this
R section of the manual. A landing gear system malfunction
R detected by the flight crew is normally entered in the aircraft
R flight log book and reported to maintenance personnel by a FIRM
R fault code number. This number and the flight log book write-up
R can be found in the Chapter 32 Fault Code Index. The index
R specifies the maintenance manual section, fault isolation
R diagram figure number and, where appropriate, a block number
R indicating the diagram entry point containing the fault
R isolation procedure. When no block number is specified, the
R diagram entry point is Block 1.

R Prerequisites listed at the top of each diagram identify
R mandatory preliminary steps and circuit breakers that must be
R closed before initiating any fault isolation step.

R Schematic diagrams, identified by a SCHEM number, supplement
R fault isolation procedures as maintenance aids. The schematics
R show the basic system circuitry necessary for troubleshooting
R and include cross-reference indexes to the wiring diagram manual
R pages required for checking component interconnect wiring.

R 2. Supplemental Data

R Supplementary data includes functional tests, checkout tests,
R BITE checks and other general information that can be helpful in
R performing fault isolation. Supplementary data in this section
R is listed in Table 101.

Supplemental Data Table 101	
FIGURE	TITLE
101	Hydraulic Alternate Extension System Hydraulic Diagram

R 3. Fault Isolation

R Table 102 is a list of fault isolation data in this section of
R the manual.

EFFECTIVITY: ALL

32-36-00
Page 101
Mar 15/81

0018

LOCKHEED
MAINTENANCE MANUAL

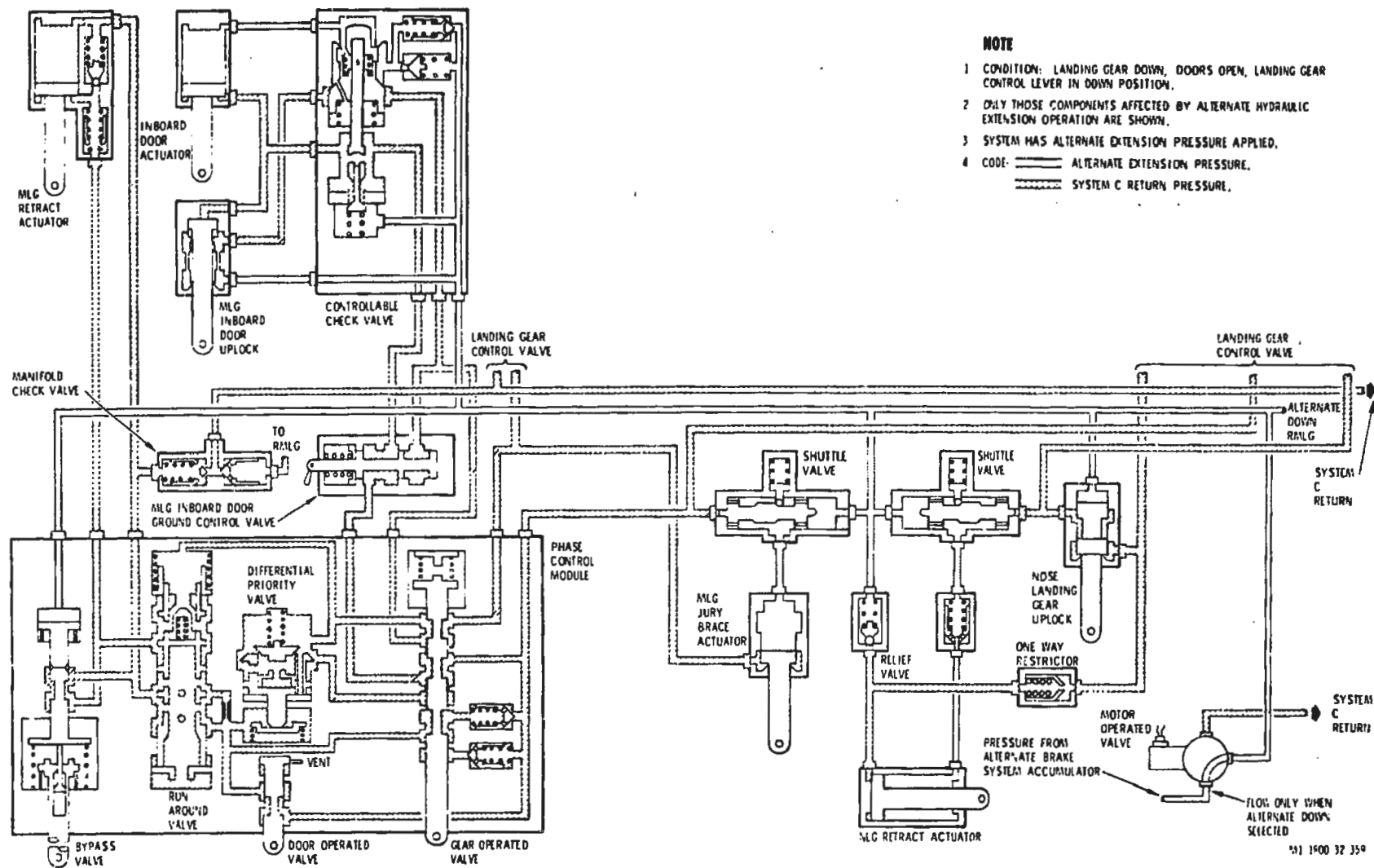
R Hydraulic Alternate Extension System - Fault Isolation
R Table 102

R	FIGURE	TITLE
R	102	Component Location Index
R	103	Component Locator Diagram
R	104	Landing Gear Does Not Extend
R	SCHEM 1	Hydraulic Alternate Extension System Electrical Schematic

EFFECTIVITY: ALL

001B

32-36-00
Page 102
Mar 15/81



31 1500 32 350

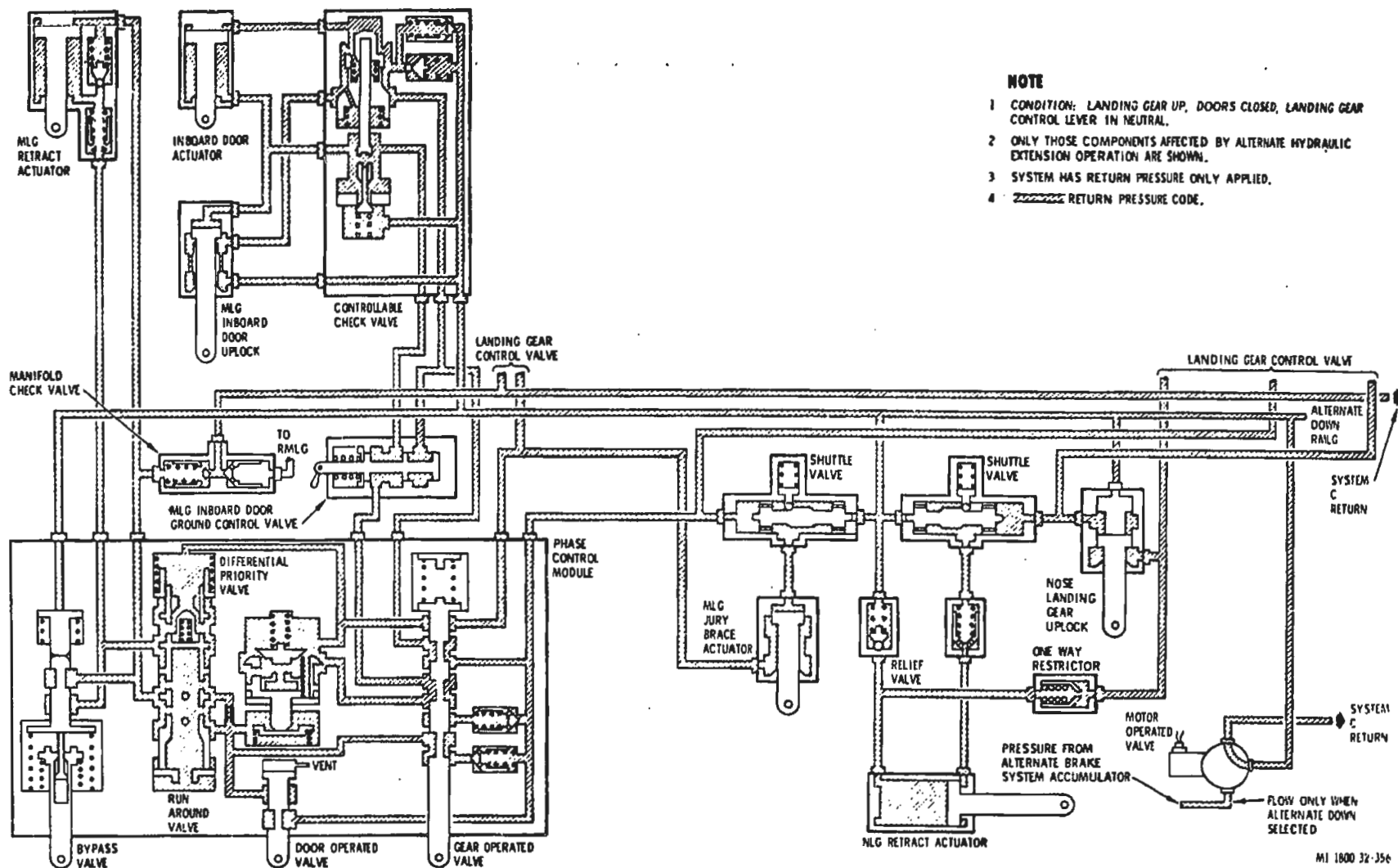
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Hydraulic Alternate Extension System Hydraulic Diagram
Figure 101 (Sheet 1)

EFFECTIVITY: ALL

32-36-00
Page 103/104
Mar 15/81

001B



NOTE

- 1 CONDITION: LANDING GEAR UP, DOORS CLOSED, LANDING GEAR CONTROL LEVER IN NEUTRAL.
- 2 ONLY THOSE COMPONENTS AFFECTED BY ALTERNATE HYDRAULIC EXTENSION OPERATION ARE SHOWN.
- 3 SYSTEM HAS RETURN PRESSURE ONLY APPLIED.
- 4  RETURN PRESSURE CODE.

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Hydraulic Alternate Extension System Hydraulic Diagram
Figure 101 (Sheet 2)

EFFECTIVITY: ALL

32-36-00
Page 105/106
Mar 15/81

0018

LOCKHEED



MAINTENANCE MANUAL

COMPONENT	QTY	AREA/ACCESS	REFERENCE
SWITCH, ALT HYDRAULIC LG EXTENSION	1	FLIGHT STATION; CTR CSL	32-36-00
VALVE, ALT HYDRAULIC EXTENSION	1	HSC; 147AB	32-36-01

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Component Location Index
Figure 102

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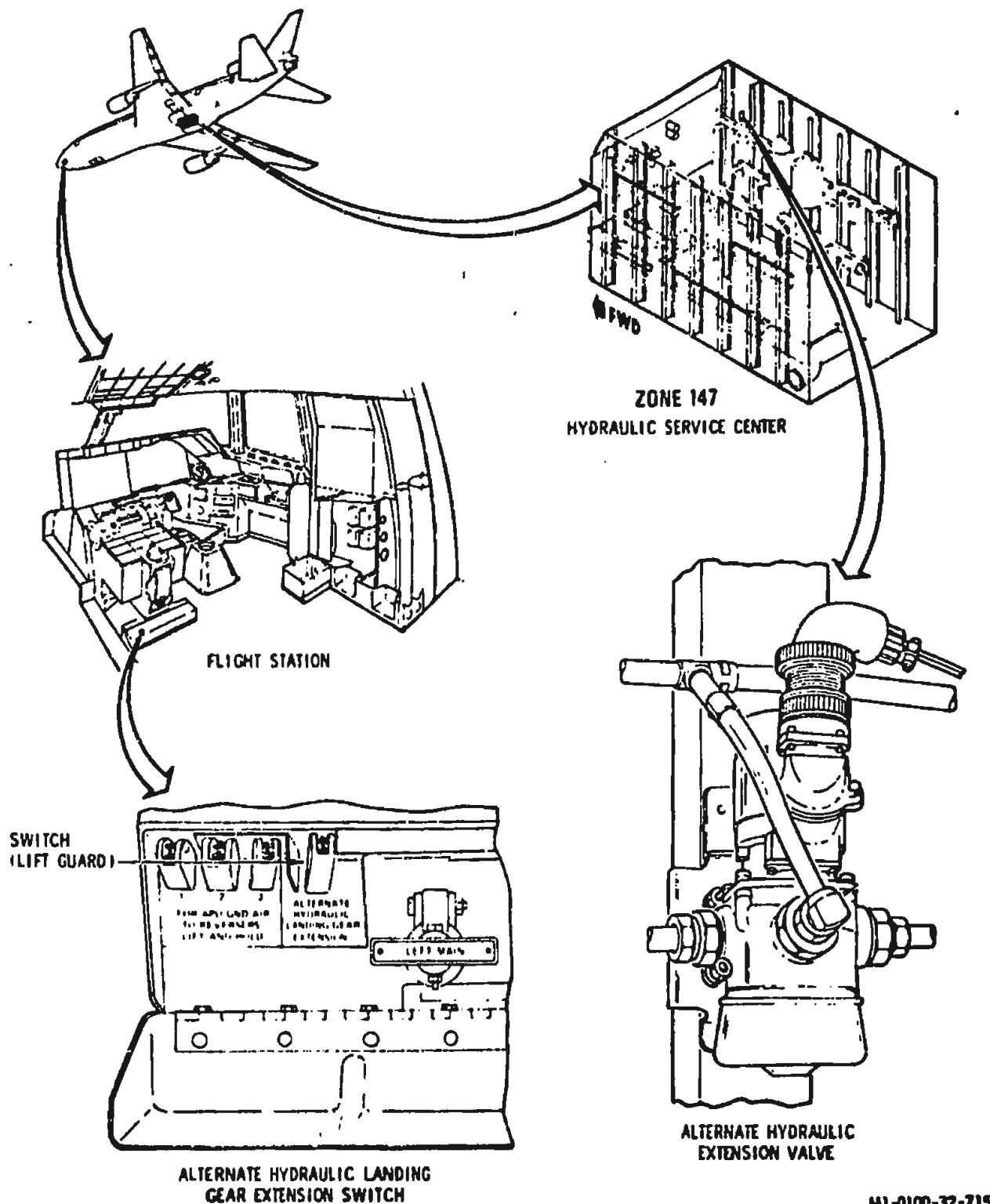
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EFFECTIVITY: ALL

32-36-00
Page 107
Mar 15/81

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-715

Hydraulic Alternate Extension System Component Locator
Figure 103

EFFECTIVITY: ALL

32-36-00
Page 108
Mar 15/81

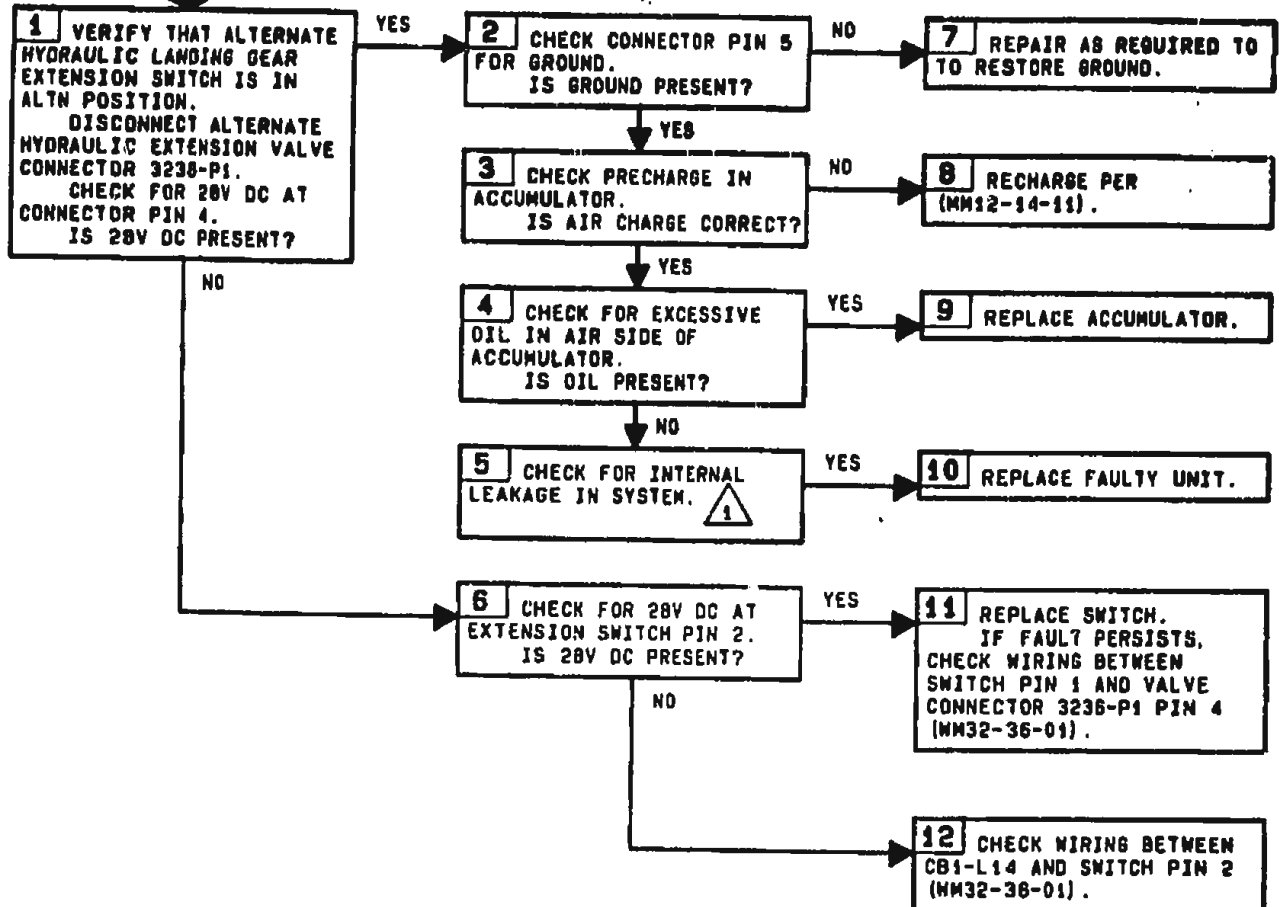
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MAINTENANCE MANUAL

PREREQUISITES
 ALTERNATE BRAKE SYSTEM & ACCUMULATOR FULLY CHARGED
 ELECTRICAL POWER ON (MM24-00-00)
 CB IN: CB1-L14

LANDING GEAR DOES NOT EXTEND USING ALTERNATE DOWN SWITCH



NOTE
 PLACE ALTERNATE HYDRAULIC LANDING GEAR EXTENSION SWITCH IN ALTN POSITION. PRESSURIZE SYSTEM WITH ATM OR HYDRAULIC GROUND TEST CART. CHECK SYSTEM FOR LEAKAGE BY FEELING HYDRAULIC TUBES FOR HEAT OR VIBRATION AND LISTENING FOR INDICATIONS OF HYDRAULIC FLOW.

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Landing Gear Does Not Extend
Figure 104

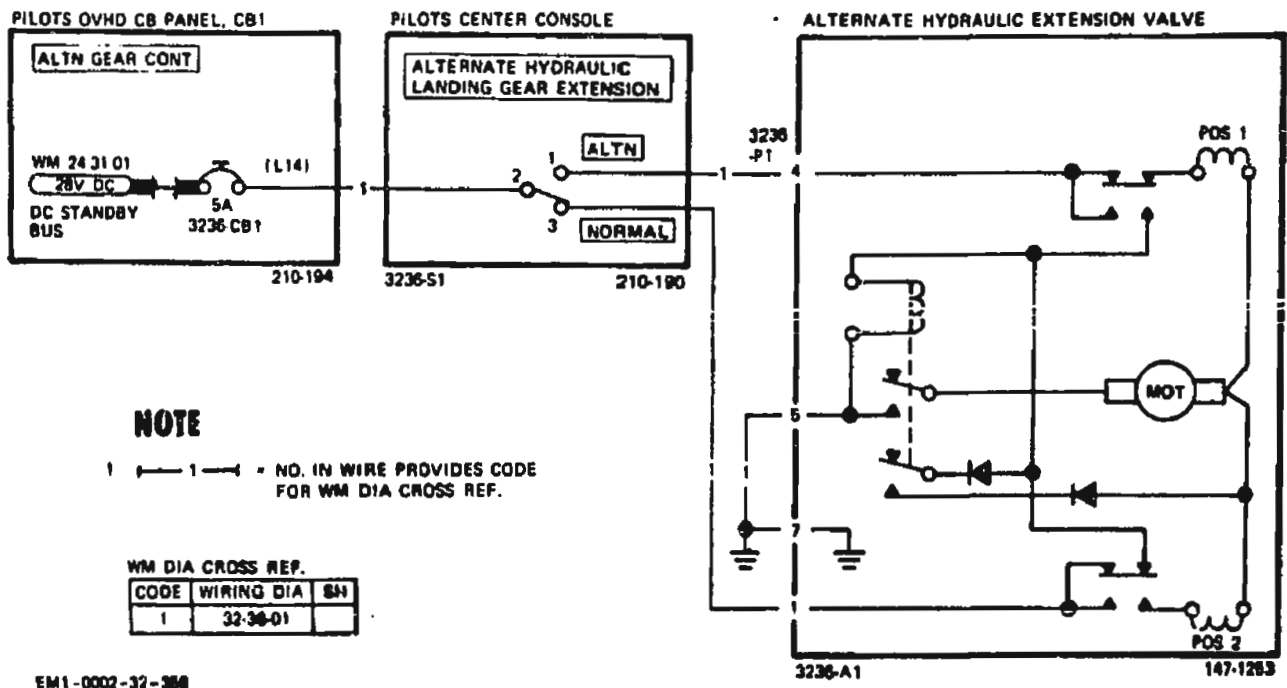
EFFECTIVITY: ALL

001B

32-36-00
 Page 109
 Nov 15/84

LOCKHEED

MAINTENANCE MANUAL



Hydraulic Alternate Extension System Electrical Schematic
SCHEM 1

EFFECTIVITY: ALL

32-36-00
Page 110
Mar 15/81

R
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LANDING GEAR HYDRAULIC ALTERNATE EXTENSION SYSTEM
MAINTENANCE PRACTICES

1. General

Paragraph 4 contains instructions for performing landing gear extension for maintenance test purposes using the hydraulic alternate extension system. In the event a malfunction makes the hydraulic alternate extension system inoperative, the system may be deactivated by performing the procedures contained in Paragraph 5.

2. Equipment and Materials

Jack Pad Adapters

Forward Fuselage Jack

Wing Jack

External Hydraulic Power Supply, 55 to 76 gpm capacity

3. Referenced Procedures

7-11-00	Wing and Fuselage Jacking - Maintenance Practices
12-14-11	Landing Gear Brake Accumulator Charging
24-00-00	Electrical Power - Maintenance Practices
29-11-00	Hydraulic Power System - Maintenance Practices
32-00-00	Landing Gear - Maintenance Practices
32-33-00	Main Landing Gear Inboard Door - Maintenance Practices

4. Landing Gear Hydraulic Alternate Extension

A. Test

- (1) Jack aircraft at forward fuselage jack point and both wing jack points (Ref. 7-11-00).
- (2) Ensure that flight station landing gear control lever is in DOWN position (Ref. Fig. 201).



(3) Verify that alternate brake system accumulator has proper air change (Ref. 12-14-11).

(4) Turn on electrical power (Ref. 24-00-00).

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

(5) Turn on hydraulic system C pressure (Ref. 29-11-00).

(6) Remove NLG and both MLG downlock safety pins.

(7) Position flight station landing gear control lever to UP position. All three landing gear must be up and locked.

(8) Position flight station landing gear control lever to neutral.

(9) Turn off hydraulic system C pressure (Ref. 29-11-00) and depressurize system to zero.

R

WARNING: ENSURE THAT ALL THREE LANDING GEAR AREAS ARE CLEAR OF PERSONNEL AND EQUIPMENT.

(10) Position ALTERNATE HYDRAULIC LANDING GEAR EXTENSION switch to ALTN position. All three landing gear must extend and lock down. Main landing gear inboard doors will remain open.

(11) Verify that the three gear position lights, located on the pilots center instrument panel are on. The door light and IN TRANS light must be on. The truck light may or may not be on.

(12) Ensure that MLG DOOR SWING AREA is clear of all personnel and equipment.

(13) Position ALTERNATE HYDRAULIC LANDING GEAR EXTENSION switch to NORMAL position.

EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL

- (14) Position flight station landing gear control lever to the DOWN position.
- (15) Turn on hydraulic system C pressure (Ref. 29-11-00). MLG inboard doors must close. The truck and door lights must be off.
- (16) Install NLG and both MLG downlock safety pins.
- (17) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (18) Turn off electrical power (Ref. 24-00-00).
- (19) Lower aircraft and remove jacks.

5. Deactivation

NOTE: This deactivation procedure applies only when an aircraft is to be dispatched in accordance with the MEL.

A. Hydraulic Alternate Extension System

- (1) Install and safety landing gear downlock pins (Ref. 32-00-00).
- (2) Verify that ALTERNATE HYDRAULIC LANDING GEAR EXTENSION switch is in off position.
- (3) Add ALTERNATE EXTENSION INOPERATIVE placard next to flight station ALTERNATE HYDRAULIC LANDING GEAR EXTENSION switch.
- (4) Make appropriate entry in aircraft log book.

6. Hydraulic System Test

A. Hydraulic System C

- (a) Verify that all landing gear downlock safety pins are installed.
- (b) Turn on electrical power (Ref. 24-00-00).
- (c) Turn on hydraulic system C pressure (Ref. 29-11-00).
- (d) Turn nose gear steering wheel in both directions while verifying that nose gear steering functions.

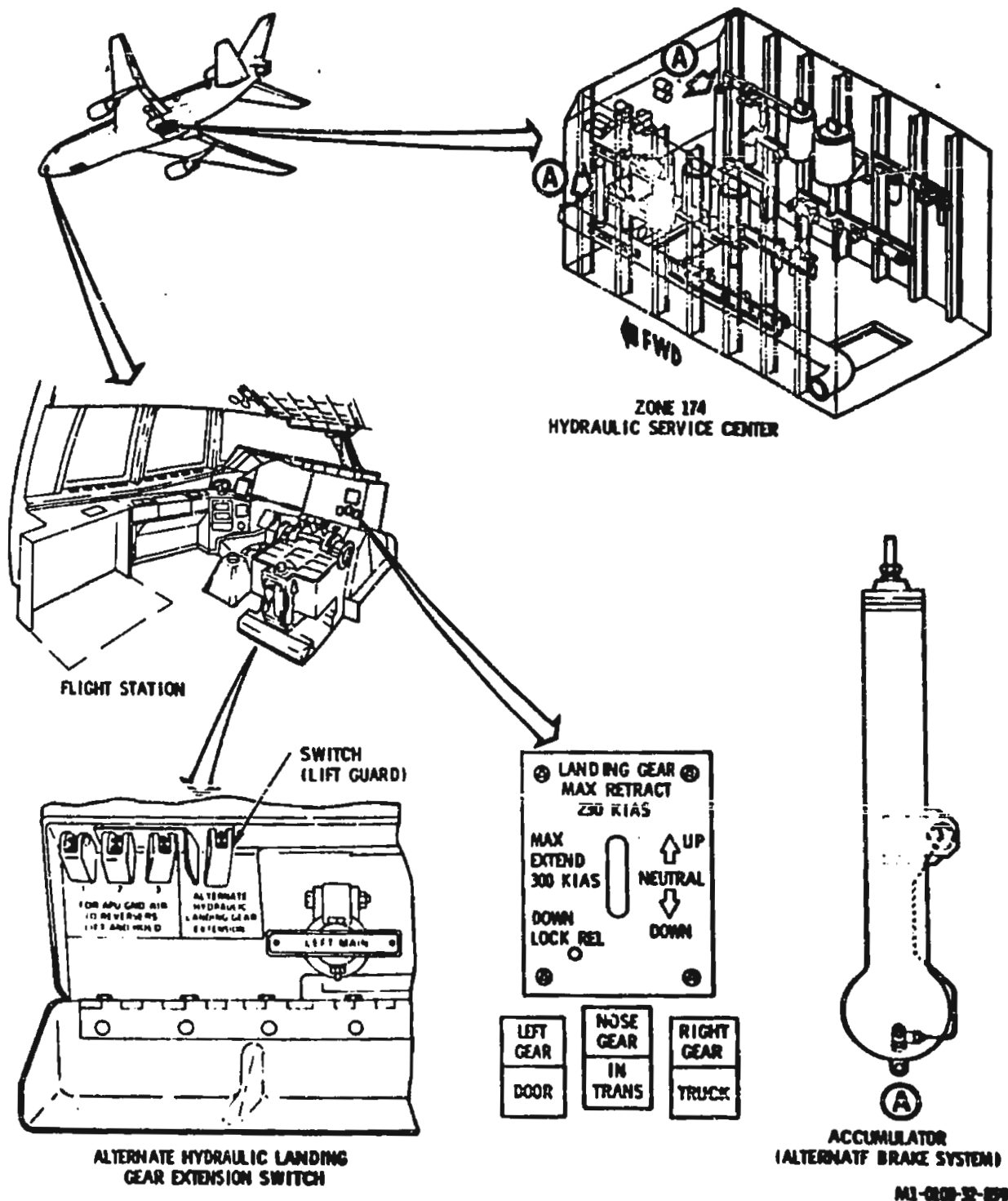


- (e) Using ground control D-handles, open and close both main landing gear doors (Ref. 32-33-00).
- (f) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (g) Visually inspect inboard door actuator uplocks to verify that doors are locked in up position.
- (h) Turn off electrical power (Ref. 24-00-00).

B. Alternate Brake Accumulator

- (1) Verify that alternate brake accumulator is operable as follows:
 - (a) Turn on hydraulic system C pressure (Ref. 29-11-00).
 - (b) Turn on electrical power (Ref. 24-00-00).
 - (c) Note alternate brake indicated pressure.
 - (d) Position BRAKE SYS SELECT switch to ALT SYS C.
 - (e) Turn off hydraulic system C pressure (Ref. 29-11-00).
 - (f) Observe alternate brake indicated pressure in 5 minutes. Pressure must not decrease.
 - (g) Apply brakes fully eight times while observing brake assemblies. Brakes must actuate.
 - (h) Turn on hydraulic system C pressure (Ref. 29-11-00) to verify that accumulator will charge hydraulically, then turn off system C pressure as required.

LOCKHEED
MAINTENANCE MANUAL



Landing Gear Hydraulic Alternate Extension System Controls
and Associated Accumulator
Figure 201

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32-36-00
Page 205/206
Feb 15/79

LOCKHEED
MAINTENANCE MANUAL

R LANDING GEAR HYDRAULIC ALTERNATE EXTENSION VALVE
REMOVAL AND INSTALLATION

1. Equipment and Materials

Container, 2-quart capacity, or equivalent

Lock-wire, QQ-W-390, 0.020-inch diameter, or equivalent

2. Referenced Procedures

12-13-01 Hydraulic Bootstrap Reservoir - Servicing

24-00-00 Electrical Power - Maintenance Practices

29-11-00 Hydraulic Power System - Maintenance Practices

3. Removal/Installation

A. Removal

- (1) Ensure that main landing gear (MLG) and nose landing gear (NLG) downlock safety pins are installed.
- (2) Ensure that hydraulic system C pressure is 0 psi (Ref. 29-11-00).
- (3) Turn on electrical power (Ref. 24-00-00).
- (4) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, ensure that circuit breakers PARKING BRAKE NO. 1 (G18) and BRAKE PRESS IND (G21) are closed.
- (5) On pilots center instrument panel, zone 210, position BRAKE SYS SELECT switch to ALT SYS C.
- (6) Actuate brake pedals until alternate brake system pressure is 0 psi.
- (7) Turn off electrical power (Ref. 24-00-00).
- (8) Open and tag circuit breaker PARKING BRAKE NO. 1 (G18).
- (9) On pilots overhead circuit breaker panel CB1, open and tag circuit breaker ALTN GEAR CONT (L14).
- (10) Open hydraulic service center access door 147AB.

EFFECTIVITY: ALL

32-36-01
Page 401
May 15/77



MAINTENANCE MANUAL

- R (11) In hydraulic service center, disconnect electrical
R connector from alternate hydraulic extension valve
R (Ref. Fig. 401).
- R (12) Position container under valve to catch spilled fluid
R and disconnect hydraulic lines from valve port
R adapters.
- R (13) Remove port adapters from valve and retain for
R installation in replacement valve.
- R (14) Install plugs in hydraulic lines and valve ports to
R prevent contamination.
- R (15) Remove bolts securing valve to mounting bracket.
R Remove valve.
- R B. Installation
- R (1) Ensure that hydraulic system C pressure is 0 psi.
- R (2) Ensure that circuit breaker ALTN GEAR CONT (L14) is
R open and tagged.
- R (3) Position valve on mounting bracket and secure in place
R with bolts.
- R (4) Remove plugs from valve ports and install adapters
R removed in Step A(13).
- R (5) Remove plugs from hydraulic lines and connect hydraulic
R lines to valve port adapters.
- R (6) Connect electrical connector to valve and safety with
R lock-wire.
- R (7) Check valve operation as follows:
- R (a) Ensure that MLG and NLG downlock safety pins are
R installed.
- R (b) Ensure that pilots LANDING GEAR control lever is
R in DOWN position.
- R (c) Ensure that ALTERNATE HYDRAULIC LANDING GEAR
R EXTENSION switch is in NORMAL position.
- R (d) Remove tags and close circuit breakers opened in
R Steps A(8) and (9).
- R (e) Turn on electrical power (Ref. 24-00-00).

R EFFECTIVITY: ALL
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0188

32-36-01
Page 402
May 15/74



MAINTENANCE MANUAL

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

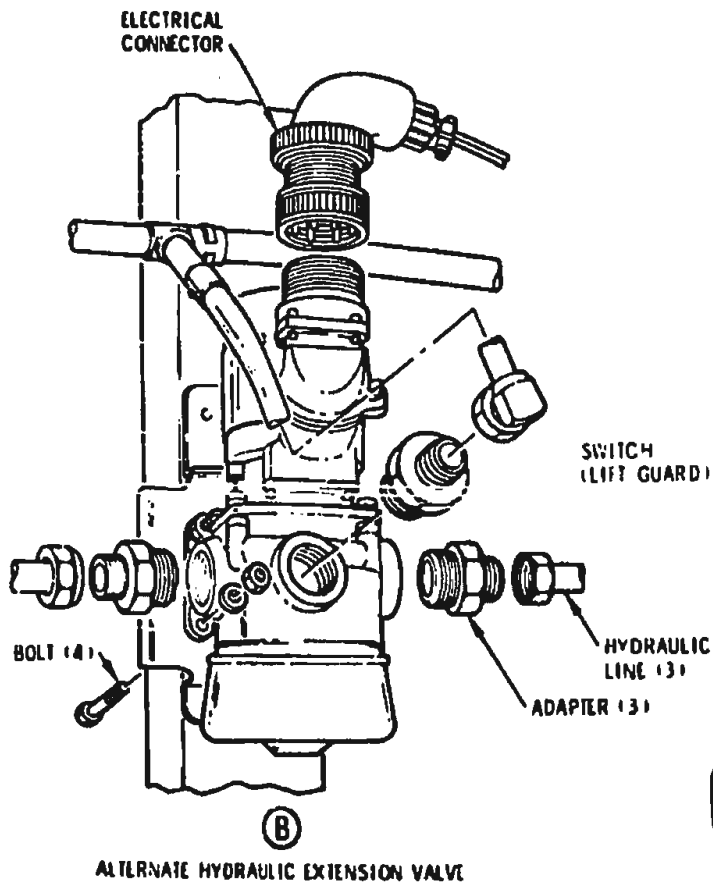
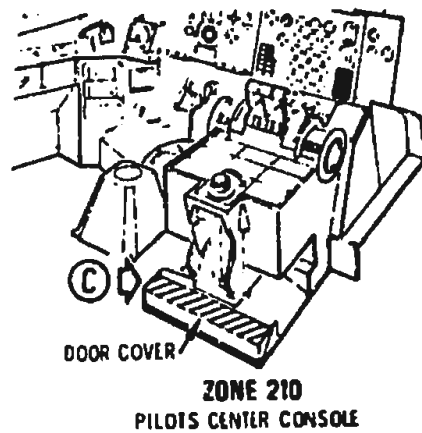
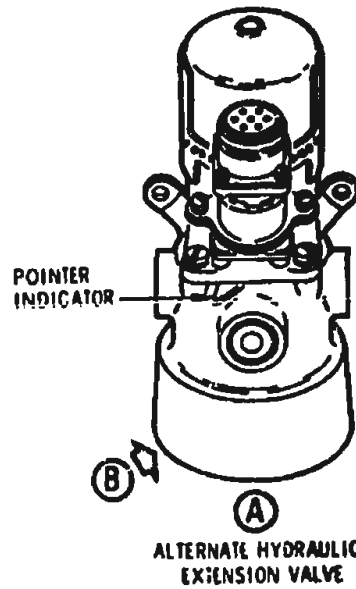
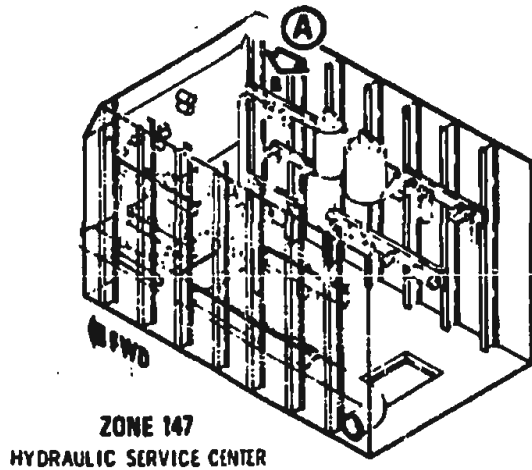
THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (f) Turn on hydraulic system C pressure (Ref. 29-11-00).
- (g) Ensure that alternate brake system pressure is 3000 psi minimum.
- (h) Turn off hydraulic system C pressure (Ref. 29-11-00).

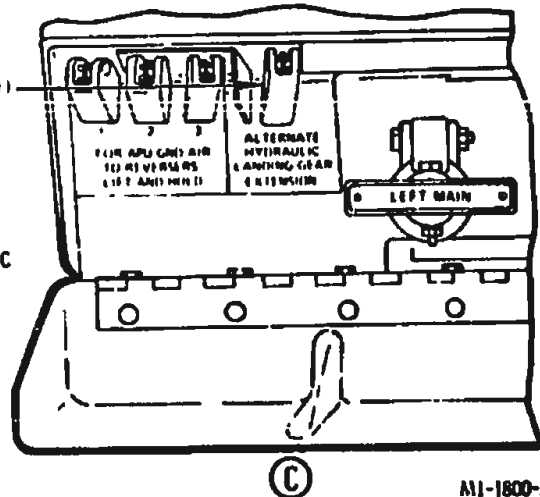
WARNING: MLG DOOR SWING AREA MUST BE CLEAR OF ALL PERSONNEL AND EQUIPMENT PRIOR TO OPENING OR CLOSING DOORS.

- (i) Position ALTERNATE HYDRAULIC LANDING GEAR EXTENSION switch to ALTN. MLG inboard doors must open. Valve pointer indicator must be in POS 1 position.
 - (j) Observe precautions and turn on hydraulic system C pressure (Ref. 29-11-00).
 - (k) Position ALTERNATE HYDRAULIC LANDING GEAR EXTENSION switch to NORMAL. MLG inboard doors must close. Valve pointer indicator must be in POS 2 position.
 - (l) Repeat Steps (h) through (k) three or four times to clear any entrapped air in system.
- (8) Bleed hydraulic system C reservoir (Ref. 12-13-01).
 - (9) Turn off hydraulic system C pressure as applicable (Ref. 29-11-00).
 - (10) Turn off electrical power as applicable (Ref. 24-00-00).
 - (11) Close hydraulic service center access door 147AB.

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MAINTENANCE MANUAL



SWITCH
(LIFT GUARD)



MI-1800-22-451

Hydraulic Alternate Landing Gear Extension Valve
Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-36-01
Page 404
May 15/77

001B



LANDING GEAR MECHANICAL ALTERNATE EXTENSION SYSTEM DESCRIPTION AND OPERATION

1. General

A method to manually extend the landing gears is provided by three separate, self-returning, single-cable systems. These systems are operated by three ratchet locking T-handles located aft of the pedestal under a door just above the floor in the flight station. The center handle, designated NOSE and BYPASS, operates the nose landing gear (NLG) release and the overall system bypass valve. The other two handles, designated LEFT MAIN and RIGHT MAIN, are located to the left and right of the NOSE and BYPASS handle, operate the main landing gear (MLG) systems.

The systems are shown schematically in Figure 1. When a T-handle is operated, it is held in its extended position by a ratchet and spring-loaded pawl. A system is returned to normal by rotating the T-handle in either direction to disengage the ratchet, lowering the handle to its first stop, and then rotating the handle and lowering it to its initial position. The cover cannot be closed until all three T-handles are fully retracted.

R The NOSE and BYPASS handle is normally operated first. If the normal system selector valve fails in the gear-up position, the bypass valve located in the landing gear control module, zone 147, must be opened before any of the three gears will free-fall. The NOSE and BYPASS handle opens the main bypass valve and releases the NLG uplock, which permits the NLG to free-fall. The NLG doors are mechanically driven by the NLG. None of the three gears can be retracted by the normal system with the NOSE and BYPASS handle fully extended.

Each MLG handle releases the respective door uplock and operates the respective bypass valve in the phase control valve, zones 145 and 146. The hydraulic sequencing of the gear is bypassed, which allows the gear and door to free-fall open. A MLG cannot be retracted by the normal system if the manual release handle is fully extended.

The slotted links shown in Figure 2 perform the following functions. The MLG slotted links and the NLG slotted link supply lost motion, which permits cable return springs to function as cable thermal compensation springs to prevent the operation of the MLG system or the phase control bypass valve by large temperature extremes. The bypass phase control valve incorporates a return spring that provides independent compensation. Temperature changes on the cable to the main

EFFECTIVITY: ALL

32-37-00

Page 1
May 15/82

LOCKHEED



MAINTENANCE MANUAL

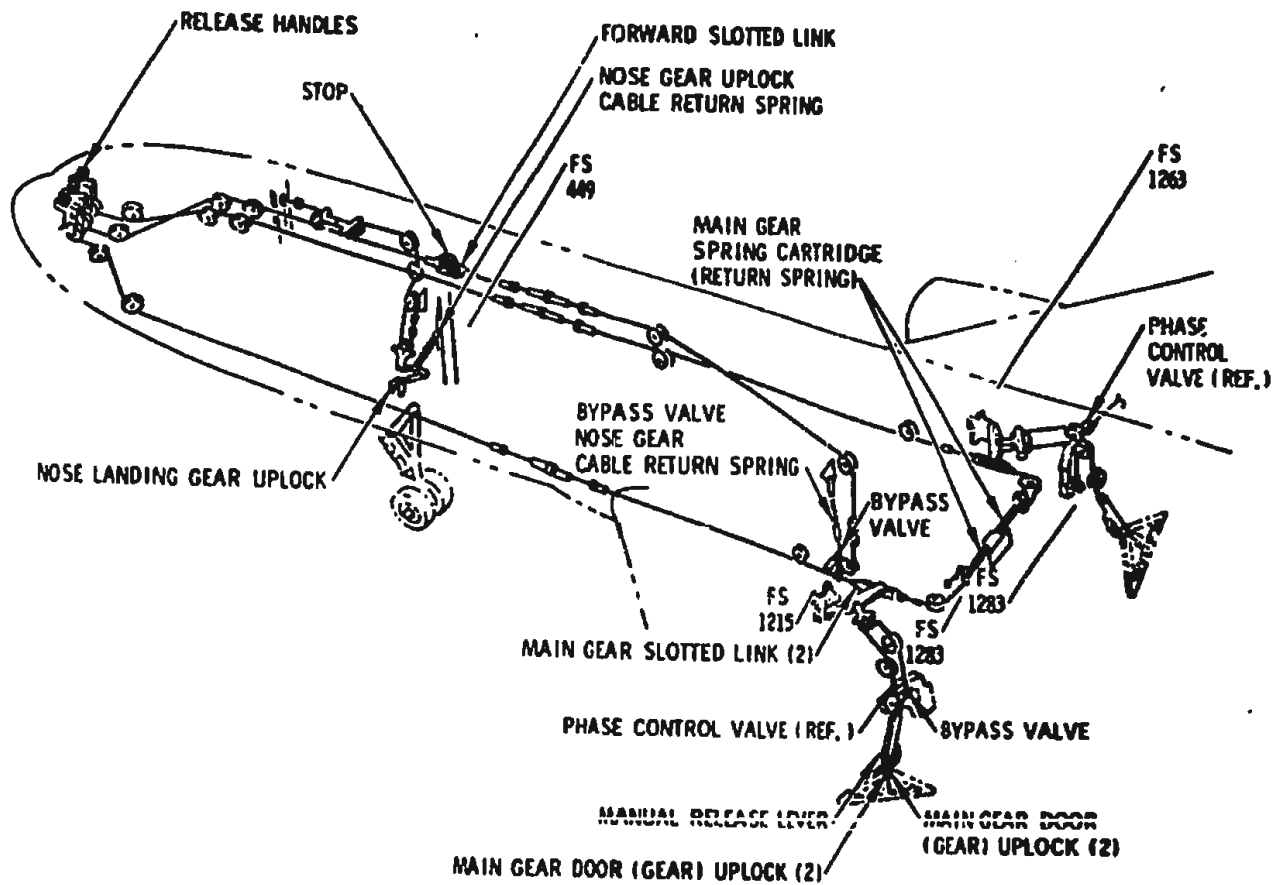
bypass valve are prevented from operating the NLG uplock by the forward slotted link. Because the main bypass valve cable return spring exerts a greater load on the forward slotted link than the NLG uplock cable return spring, the forward slotted link remains bottomed out against a pin anchored to structure. Lost motion in the NLG uplock mechanism allows that cable return spring to function as a cable temperature compensation spring. The MLG door uplocks and phase control bypass valves incorporate lost motion and return springs. These springs also function as cable temperature compensation springs. The lost motion is such that temperature compensation cannot operate either device.

EFFECTIVITY: ALL

050B

32-37-00
Page 2
Dec 1/71

LOCKHEED
MAINTENANCE MANUAL



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Landing Gear Mechanical Alternate Extension System
Figure 1

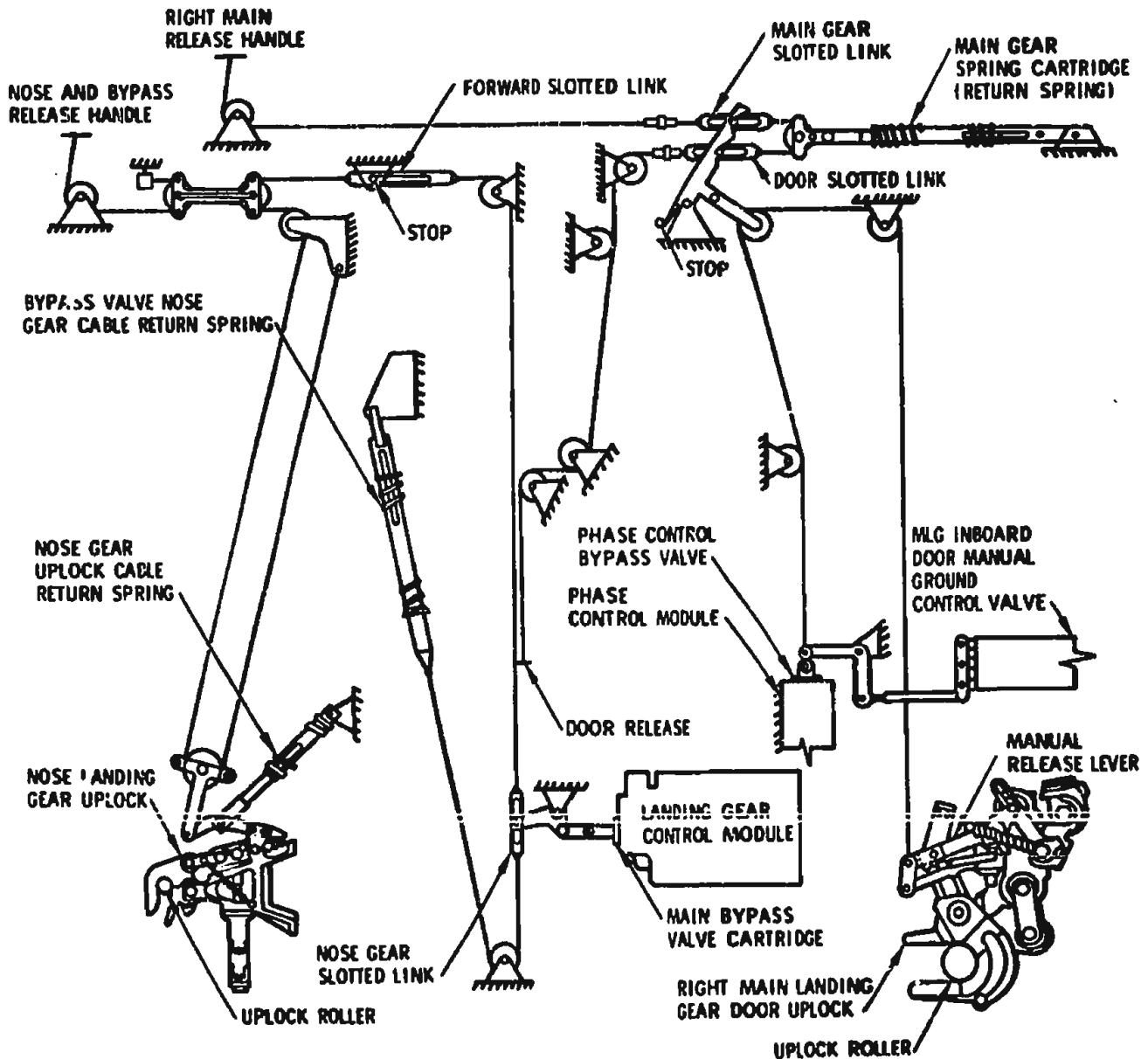
EFFECTIVITY: ALL

32-37-00
Page 3
May 15/77

R
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LOCKHEED
MAINTENANCE MANUAL

NOTE
RIGHT MAIN MANUAL RELEASE SHOWN,
TYPICAL OF LEFT MAIN MANUAL RELEASE



M1-0103-32-163

Landing Gear Mechanical Alternate Extension System Schematic
Figure 2

EFFECTIVITY: ALL

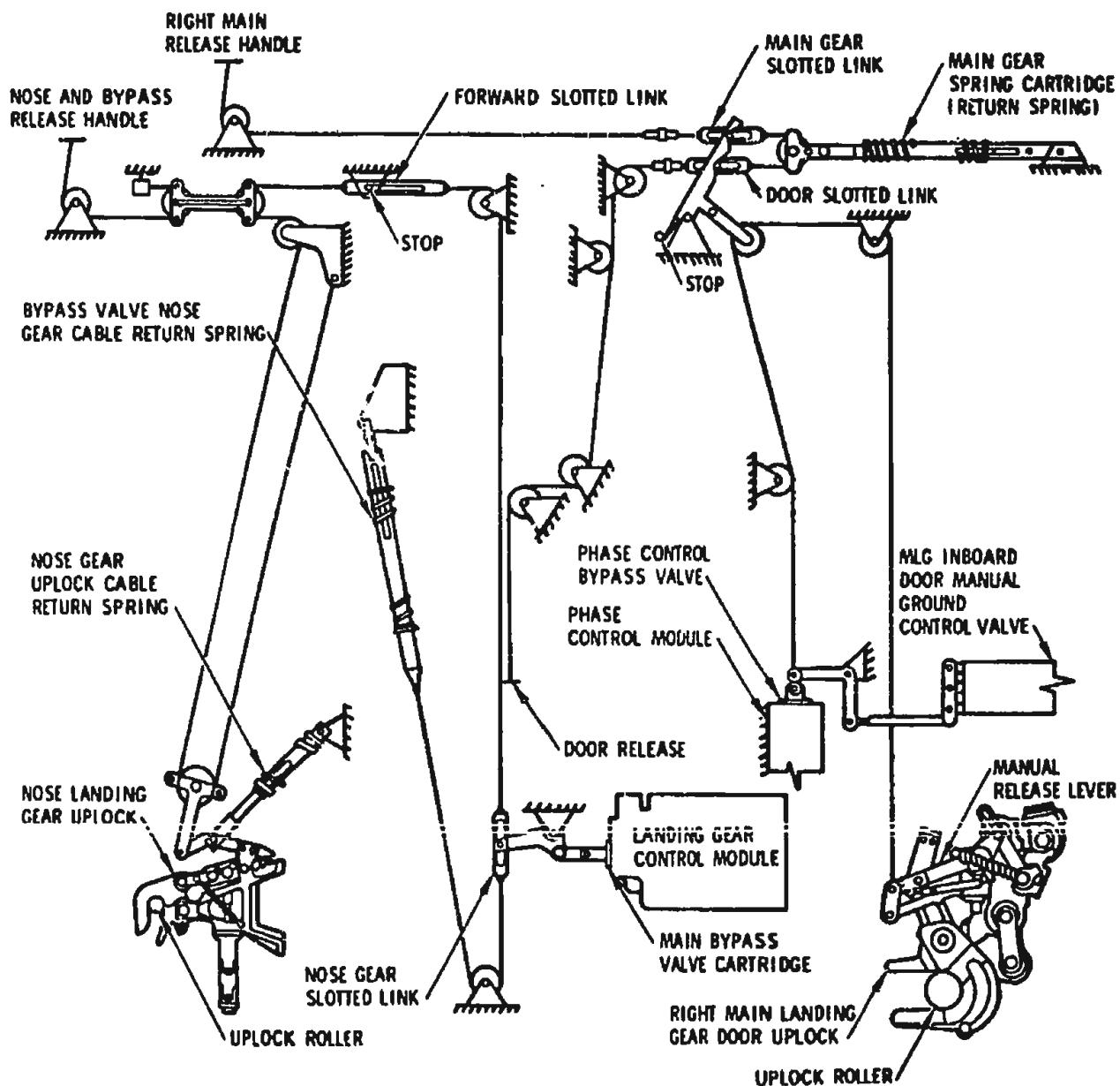
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Page 4
May 15/77

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001B

LOCKHEED
MAINTENANCE MANUAL

NOTE

RIGHT MAIN MANUAL RELEASE SHOWN,
TYPICAL OF LEFT MAIN MANUAL RELEASE



MI-0103-32-163

R Mechanical Alternate Extension System Mechanical Diagram
R Figure 101

EFFECTIVITY: ALL

32-37-00

Page 102
Mar 15/81

001B

LOCKHEED



MAINTENANCE MANUAL

R Mechanical Alternate Extension System - Fault Isolation
R Table 102

R	FIGURE	TITLE
R	102	Component Location Index
R	103	Component Locator Diagram
R	104	Landing Gear Does Not Extend

001B EFFECTIVITY: ALL

32-37-00
Page 103
Mar 15/81

LOCKHEED
MAINTENANCE MANUAL

COMPONENT	QTY	AREA/ACCESS	REFERENCE
RETURN SPRING, NLG UNLOCK CABLE	1	NLG WHEEL WELL	32-37-00
SPRING CARTRIDGE, NLG	2	NLG WHEEL WELL	32-37-00
UNLOCK ASSEMBLY, NLG	2	NLG INBD DOOR ACTUATOR	32-33 01
UNLOCK ASSEMBLY, NLG	1	NLG WHEEL WELL	32-34 05

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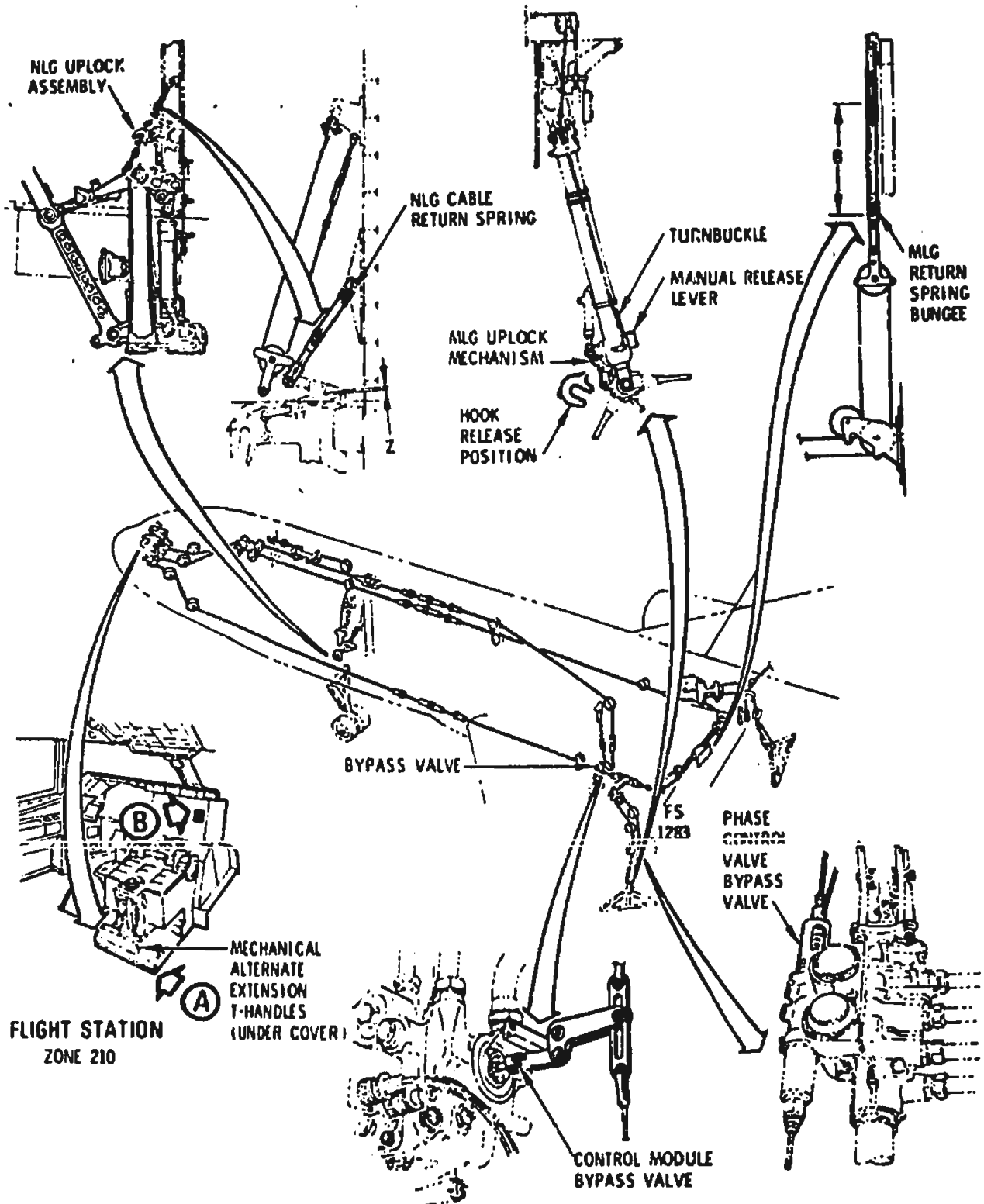
Component Location Index
Figure 102

EFFECTIVITY: ALL

001B

32-37-00
Page 104
Mar 15/81

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-724

Mechanical Alternate Extension System Component Locator
Figure 103

EFFECTIVITY: ALL

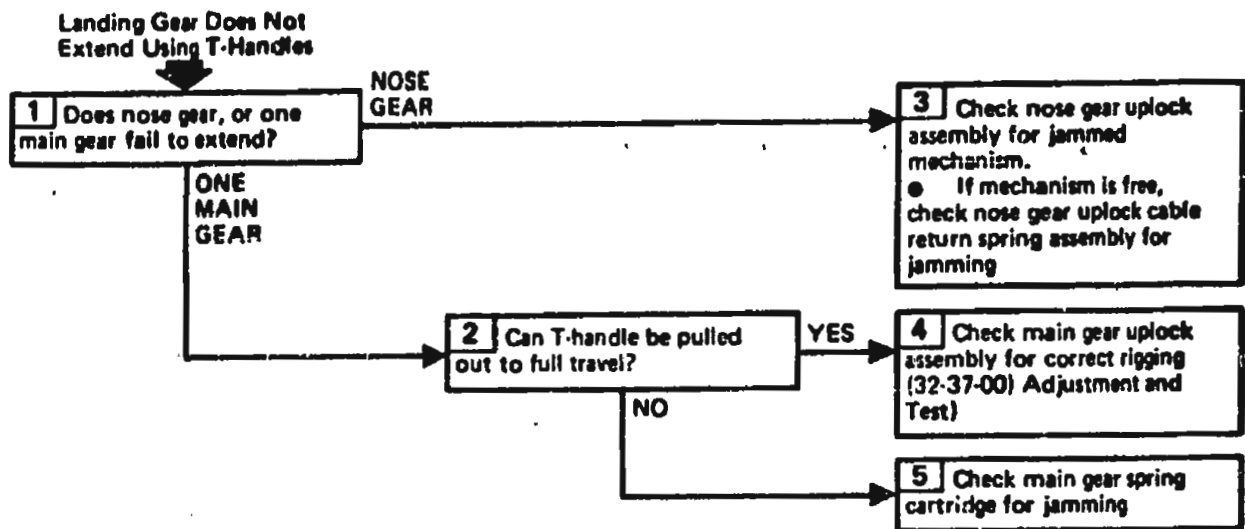
32-37-00
Page 105
Mar 15/81

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LOCKHEED
MAINTENANCE MANUAL



PREREQUISITES
None

M1-0100-32-688

Landing Gear Does Not Extend
Figure 104

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EFFECTIVITY: ALL

32-37-00
Page 106
Mar 15/81



LANDING GEAR MECHANICAL ALTERNATE EXTENSION SYSTEM
MAINTENANCE PRACTICES

R 1. General

R In the event a malfunction makes the mechanical alternate
R extension system inoperative, the system may be deactivated by
R performing the procedures contained in Paragraph 3A.
R Verification of landing gear functions using hydraulic system C
R pressure is contained in Paragraph 3B.

R 2. Referenced Procedures

R 24-00-00 Electrical Power - Maintenance Practices
R 29-11-00 Hydraulic Power System - Maintenance Practices
R 32-00-00 Landing Gear - Maintenance Practices
R 31-31-14 Landing Gear Control Switch - Maintenance Practices
R 32-33-00 Main Landing Gear Inboard Door - Maintenance
R Practices

R 3. Deactivation

R NOTE: This deactivation procedure applies only when an aircraft
R is to be dispatched in accordance with the MEL.

R A. Deactivation Procedure

R (1) Verify that LANDING GEAR UPLOCK MECHANICAL RELEASE
R T-handles are fully stowed (pushed in).

R (2) Verify that T-handle cover can be fully closed.

R (3) Inspect T-handle cables for slack.

R NOTE: If slack is present, the possibility of a broken
R cable exists.

R (4) If a broken cable exists, secure broken cable ends to
R prevent further slackening of cables and interference
R with adjacent cables, structure, components, and
R electrical wiring.

R (5) Verify that landing gear will retract and install
R landing gear lever blocking device (Ref. 32-31-14). If

EFFECTIVITY: ALL

32-37-00

Page 201
Nov 15/81



MAINTENANCE MANUAL

R gear will not retract install and safety gear downlock
R safety pins (Ref. 32-00-00).

R (6) Install MECHANICAL ALTERNATE EXTENSION INOPERATIVE
R placards.

(7) Make appropriate entry in aircraft log book.

B. Hydraulic System C Test

- (1) Verify that landing gear extension hydraulic pressure is available at nose and main gears as follows:
 - (a) Verify that all landing gear downlock safety pins are installed.
 - (b) Turn on electrical power (Ref. 24-00-00).
 - (c) Turn on hydraulic system C pressure (Ref. 29-11-00).
 - (d) Turn nose gear steering wheel in both directions while verifying that nose gear steering functions.
 - (e) Using ground control D-handles, open and close both main landing gear doors (Ref. 32-33-00).
 - (f) Turn off hydraulic system C pressure (Ref. 29-11-00).
 - (g) Visually inspect inboard door actuator uplocks to verify that doors are locked in up position.
 - (h) Turn off electrical power (Ref. 24-00-00).

EFFECTIVITY: ALL

001B

32-37-00
Page 202
Nov 15/81



LANDING GEAR MECHANICAL ALTERNATE EXTENSION SYSTEM
ADJUSTMENT AND TEST

1. General

The landing gear mechanical alternate extension system must be rigged after repair or replacement of linkage, cables, or whenever maintenance requirements dictate. The temperature of the aircraft and cables should be stabilized for a minimum of one hour prior to rigging. Air conditioning equipment should not be operated prior to, or during rigging. The specified tension is based on a temperature of 70 degrees Fahrenheit (21°C). The temperature-tension compensation charts (Ref. Fig. 501 Views H, K, N, O, and P) shall be referred to when rigging at other temperatures. All electrical power and hydraulic system C power associated with the mechanical alternate extension system shall be off prior to start of rigging procedures.

R Paragraph 6 contains instructions for performing an operational
R test of the landing gear mechanical alternate extension system.
R Separate tests are provided for aircraft on their landing gear
R and for aircraft on jacks. Either test will give valid results.
The nose landing gear (NLG) is extended first in order to
position the landing gear control module manual bypass valve.
The main landing gear (MLG) is extended next, either together or
one at a time.

2. Equipment and Materials

Rigpins, 5/16-inch steel, 4-inches long (two required)

Fish scale, capable of indicating up to 50 lb, or equivalent

Lock-wire, QQ-W-390, 0.020-inch diameter, or equivalent

Jack Pad Adapters

Forward Fuselage Jack

Wing Jack

Solvent, Fed Spec TTN-958, or equivalent

Silicone Oil, MIL-S-81087A, or equivalent

External Hydraulic Power Supply, 55 to 76 gallon per minute
(gpm) capacity

EFFECTIVITY: ALL

001B

32-37-00
Page 501
Dec 15/92



3. Referenced Procedures

- 7-11-00 Wing and Fuselage Jacking
- 24-00-00 Electrical Power - Maintenance Practices
- 29-11-00 Hydraulic Power System - Maintenance Practices
- 32-33-00 Main Landing Gear Inboard Door - Maintenance Practices
- 32-37-00 Landing Gear Mechanical Alternate Extension System - Maintenance Practices

4. Main Landing Gear (MLG)

A. Manual Release Adjustment

- (1) Open MLG inboard doors (Ref. 32-33-00).
- (2) Verify that hydraulic system C pressure is 0 psi (Ref. 29-11-00).
- R (3) Stow MLG manual DOOR HANDLE controls (Ref. Fig. 502).
- R (4) Verify that LANDING GEAR control lever on pilots center instrument panel, zone 210, is in DOWN position and tagged.
- R
- R (5) Verify that flight station, zone 210, LEFT MAIN and RIGHT MAIN LANDING GEAR UPLOCK MECHANICAL RELEASE handles, and both wing fairing MLG manual DOOR HANDLE controls are in stowed position (Ref. Fig. 502).
- R
- R (6) If aircraft is on jacks, verify that all landing gears are in down and locked position (downlock safety pins in place).

NOTE: The right and left MLG mechanical alternate extension systems are separate, but identical, and may be rigged separately or simultaneously. The procedures contained herein are for one system at a time. This does not limit the operation to exclude simultaneous performance.

NOTE: Strap assemblies (View D) shall freely pass the lever assembly L1 when rigging procedures are being performed.

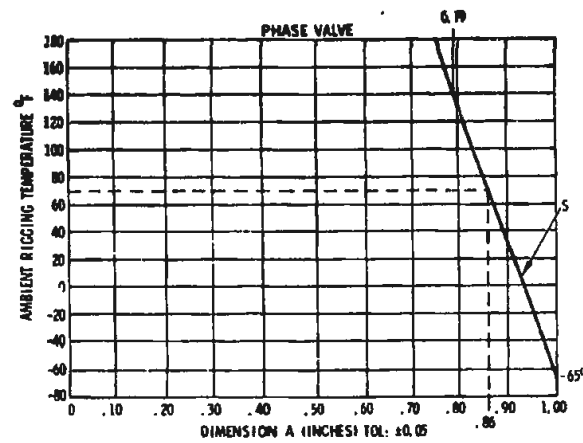
- R (7) Install rigpin R1 in manual door control valve (View C).
- R

EFFECTIVITY: ALL

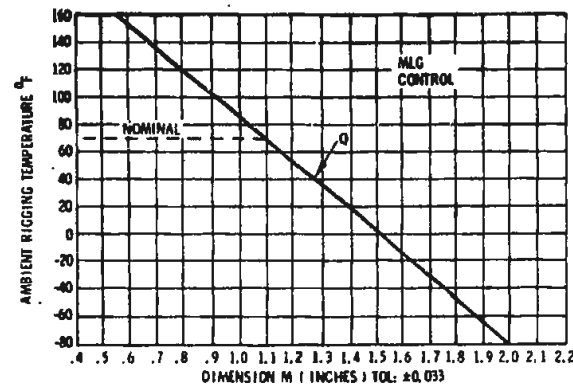
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Page 502
Mar 15/91



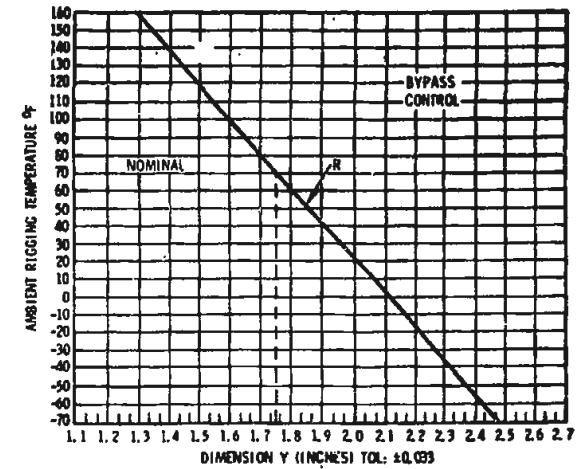
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Page 503/504
Mar 15/91



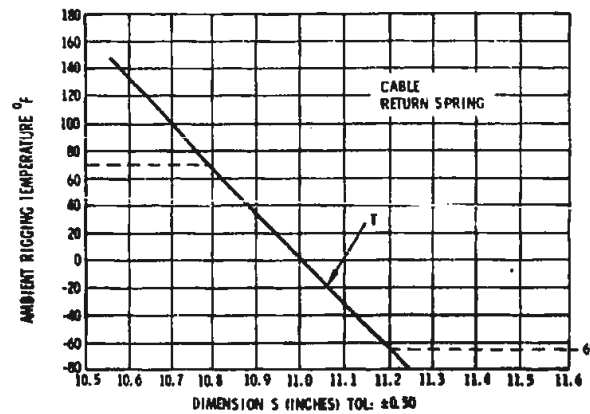
(H)



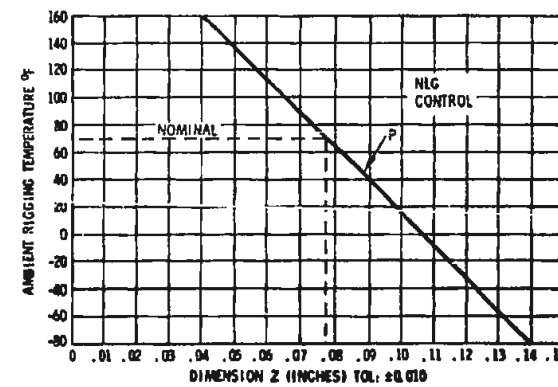
(K)



(N)



(P)



(Q)

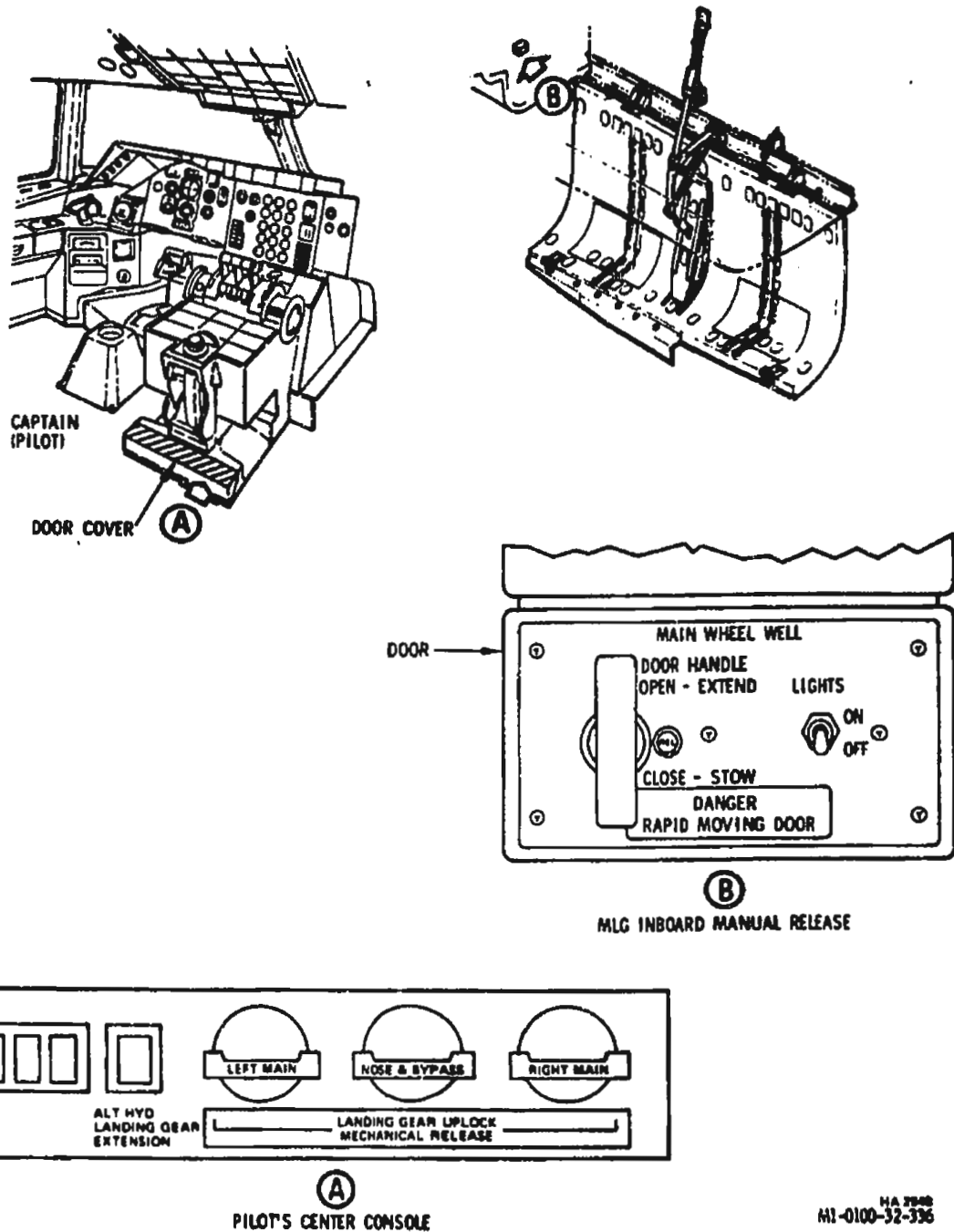
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Landing Gear Mechanical Alternate Extension System Rigging
Figure 501 (Sheet 2)

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32-37-00
Page 505/506
Mar 15/91

LOCKHEED
MAINTENANCE MANUAL



Landing Gear and Main Landing Gear Door Manual Release Controls
Figure 502

R EFFECTIVITY: ALL
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001B

32-37-00
Page 507
Mar 15/91



- R (8) Verify that phase control valve plunger P is bottomed
R out against valve body (View R).
- R (9) Adjust rod assembly RA between phase control valve and
R manual door control valve so that rigpin R1 is free
R (View C).
- R (10) Safety rod assembly with lock-wire.
- R (11) Remove rigpin R1 from manual door control valve.
- R (12) Install rigpin R2 in MLG door actuator manual release
R lever L2 (View B).
- R (13) Verify that lever assembly L1 is against stop S (View
R D).
- R (14) Using turnbuckle T1 (View B), adjust cable until rigpin
R R2 can be easily removed. Verify that phase control
R valve plunger P (View R) is bottomed out against valve
R body.
- R (15) Safety turnbuckle T1 with clip (View B).
- R (16) Remove rigpin R2.
- R (17) Determine ambient rigging temperature and select
R dimension A from curve S (View H).
- R (18) In wing fairing at FS 1163 and BL 47.84 (Ref. Fig.
R 502), pull MLG manual DOOR HANDLE until pawl W (Ref.
R Fig. 501, View E) is engaged in notch N on shaft.
- R (19) In hydraulic service center, zone 147, adjust
R turnbuckle T2 (View F) in vertical cable run until
R dimension A (View R), determined from chart (View H),
R is met (± 0.05 inch).
- R (20) Safety turnbuckle with clip (View F).
- R (21) Adjust bracket BR on access cover (View G) so that
R safety pin SP rests in bottom end of slot in door
R handle. Handle must not stow when release pushbutton
R is depressed.
- R (22) Remove safety pin SP and stow door handle.
- R (23) With applicable LEFT MAIN or RIGHT MAIN LANDING GEAR
R UPLOCK MECHANICAL RELEASE T-handle (Ref. Fig. 502) in
R stowed position, adjust turnbuckle T3 (Ref. Fig. 501,
R Views A and J) until dimension M (View D) determined

R EFFECTIVITY: ALL
R

001B

32-37-00

Page 508
Mar 15/91



MAINTENANCE MANUAL

- R from chart (View K) is met at lever assembly L1 and
R associated straps (View D).
- R (24) Safety turnbuckle with clip.
- R (25) Verify that spring bungee B1 (View D) is not bottomed
out when LEFT MAIN or RIGHT MAIN LANDING GEAR UPLOCK
MECHANICAL RELEASE T-handle, or MLG manual DOOR HANDLE
controls are stowed or deployed (Ref. Fig. 502).

B. Manual Release Test

- (1) Deploy MLG manual DOOR HANDLE H to extent required so
that pawl W (Ref. Fig. 501, View E) engages notch N in
shaft. Verify that safety pin SP (View G) can be
installed.
- (2) Stow MLG manual DOOR HANDLE by loading handle,
depressing release button, and returning handle to
stowed position (do not release handle until stowed).
- (3) Manually position MLG door actuator uplock hook (View
B) to locked position.
- (4) Deploy MLG manual DOOR HANDLE to fully deployed
position, such that pawl W (View E) has engaged notch
N, and is retaining handle in deployed position.
Maximum pull of 50 pounds force is required to fully
deploy D-handle.
- (5) Verify that MLG door actuator uplock hook (View B) is
in unlocked (released) position.

NOTE: To ensure that the uplock hook is in the fully
unlocked position, the hook must be manually
pulled open, and the secondary linkage must be
over center and against the stops. Dimension A
may not be achieved unless these conditions are
met.

- (6) Verify that phase control valve (View R) has been
stroked to dimension A, determined from chart (View H).
- (7) Repeat Step 4B(2) slowly. Verify that system will
return handle to stowed position from any partially
deployed position.
- (8) Verify that pretravel of cable system is a minimum of
0.30-inch, as shown by dimension N (View D).
- (9) Verify spring bungee B1 (View D) dimension B
corresponds with curve T (View P).

EFFECTIVITY: ALL

001B

32-37-00
Page 509
Mar 15/91



- (10) Repeat Step 4B(3).
- (11) Deploy applicable LEFT MAIN or RIGHT MAIN LANDING GEAR UPLOCK MECHANICAL RELEASE T-handle (Ref. Fig. 502). Pull handle with 42 pounds force as far as handle will travel. It is not necessary to move handle to T-handle stop. Handle self-locks in deployed position.
- (12) Verify that phase control valve plunger P (Ref. Fig. 501, View R) has stroked 1.000 inch minimum to fully open position.
- (13) Stow applicable LEFT MAIN or RIGHT MAIN LANDING GEAR UPLOCK MECHANICAL RELEASE T-handle (Ref. Fig. 502) by rotating handle 90 degrees in either direction, then retracting T-handle until it stops. Rotate T-handle 90 degrees in opposite direction until it retracts into the rig position.
- (14) Verify that all system components have returned to rig position by inserting rigpin R1 (Ref. Fig. 501, View C) control valve. Remove rigpin R1.
- (15) Return MLG door actuator uplock to unlock position.

5. Nose Landing Gear (NLG)

A. Manual Release Adjustment

- (1) Verify that alternate brake system pressure is 0 psi.
- (2) Verify that hydraulic system C pressure is 0 psi.
- (3) Verify that NLG downlock safety pin is in place.
- (4) Verify that LANDING GEAR control lever on pilots center instrument panel, zone 210, is in DOWN position and tagged.
- (5) Verify that NOSE & BYPASS LANDING GEAR UPLOCK MECHANICAL RELEASE T-handle (Ref. Fig. 502) is in stowed position.
- (6) Open NLG forward doors.
- (7) Manually position NLG uplock hook (Ref. Fig. 501, View Q) in locked position.

NOTE: Slotted links (Views L and M) shall pass freely along cable stop pin CS (View L) and bypass

R EFFECTIVITY: ALL

001B

32-37-00
Page 510
Mar 15/91



MAINTENANCE MANUAL

valve bellcrank pin BV (View M) when performing rigging procedures.

- (8) Verify that cable stop slotted link (View L) bears firmly against forward side of stop pin CS.
- (9) Verify that landing gear control module main bypass valve (View M) is in closed (retracted) position.

NOTE: When the main bypass valve (View M) is in the closed position, dimension X should be approximately 1.30 inches.

- (10) Determine ambient rigging temperature and obtain dimension Y from curve R of chart (View N).
- (11) Adjust turnbuckle T4 (View M) until dimension Y is obtained.
- (12) Safety turnbuckle with clip.
- (13) Using ambient rigging temperature, select dimension Z from curve P (View O).
- (14) While using a feeler gage at dimension Z point, adjust turnbuckle T5 (View Q) until dimension Z from chart (View O) is gained at dimension Z point (View Q).
- (15) Safety turnbuckle with clip.

B. Manual Release Test

- (1) Deploy NOSE & BYPASS LANDING GEAR UPLOCK MECHANICAL RELEASE T-handle (Ref. Fig. 502) with a force not to exceed 35 pounds.
- (2) Verify that NLG uplock hook (Ref. Fig. 501, View Q) is in unlocked position.
- (3) Further deploy NOSE & BYPASS LANDING GEAR UPLOCK MECHANICAL RELEASE T-handle (Ref. Fig. 502) with a force not to exceed 42 pounds.
- (4) Verify that transverse motion of bypass valve shaft (Ref. Fig. 501, View M) has been a minimum of 0.570-inch.
- (5) Verify that spring bungee B2 (View M) has not bottomed out (0.06-inch minimum gap between pin and slot end).

R EFFECTIVITY: ALL

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32-37-00
Page 511
Mar 15/91



6. Operational Test

R NOTE: Either Test 6A or 6B may be performed to test operation
R of the Landing Gear Mechanical Alternate Extension
R System.

R A. Aircraft on Ground (Not Jacked)

R (1) Verify NLG and MLG downlock safety pins are installed.

R (2) Verify MLG doors are closed and LANDING GEAR control
R handle is in DOWN position.

R WARNING: ENSURE LANDING GEAR AREAS ARE CLEAR OF PERSONNEL
R AND EQUIPMENT.

R (3) Pull NOSE and BYPASS T-handle to stop (Ref. Fig. 503);
R verify T-handle force does not exceed 42 pounds.

R (4) Verify freedom of downward movement of NLG uplock hook.

R (5) Pull LEFT MAIN T-handle to stop; verify T-handle force
R does not exceed 42 pounds. Verify left MLG wheel well
R door opens.

R (6) Pull RIGHT MAIN T-handle to stop; verify T-handle force
R does not exceed 42 pounds. Verify right MLG wheel well
R door opens.

R (7) Release all three T-Handles by rotating handles 90
R degrees and pushing in until stopped. Rotate handles
R in opposite direction until they retract into normal
R stowed position.

R (8) Verify both phase control bypass valves and landing
R gear control valve manual bypass valve have returned to
R original (retracted) position (Ref. Fig. 503).

R WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY
R HYDRAULIC SYSTEM:

R LANDING GEAR DOWNLOCK SAFETY PINS ARE INSTALLED.

R PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL
R FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL
R AREAS.

R THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT
R HYDRAULIC PRESSURE.

R (9) Turn on hydraulic system C. Verify MLG inboard doors
R close.

EFFECTIVITY: ALL

32-37-00
Page 512
Dec 15/92



R B. Aircraft on Jacks

- R (1) Jack aircraft at forward fuselage jack point and both
R wing jack points (Ref. 7-11-00).
- R (2) Verify LANDING GEAR control lever is in DOWN position.
- R (3) Remove rubber deposits from outboard 18 inches of MLG
R door rub strips as follows:
- R (a) Open MLG inboard door and install actuator lock
R (Ref. 32-33-00).
- R (b) Using soft, clean cloth dampened in solvent,
R remove all evidence of rubber deposits from
R outboard 18 inches of door rub strips.
- R (c) Wipe dry with clean soft cloth.
- R (d) Apply wipe coat of silicone oil to cleaned rub
R strip using clean soft cloth.
- R (e) Remove MLG inboard door actuator lock (Ref.
R 32-33-00).
- R (4) Turn on electrical power (Ref. 24-00-00).
- R WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY
R HYDRAULIC SYSTEM:
- R LANDING GEAR DOWNLOCK SAFETY PINS ARE INSTALLED.
- R PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL
R FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL
R AREAS.
- R THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT
R HYDRAULIC PRESSURE.
- R (5) Turn on hydraulic system C pressure (Ref. 29-11-00).
R MLG inboard doors will close.
- R (6) Remove NLG and both MLG downlock safety pins.
- R (7) Place LANDING GEAR control lever in UP position.
R Verify all three landing gear move to the up and locked
R position.
- R (8) Turn off hydraulic system C pressure (Ref. 29-11-00).
- R (9) Place LANDING GEAR control lever in DOWN position.

001B EFFECTIVITY: ALL



MAINTENANCE MANUAL

- R (10) Pull NOSE and BYPASS T-handle to stop (Ref. Fig. 503);
R verify T-handle force does not exceed 42 pounds.
R Verify NLG extends.
- R NOTE: NLG may not extend to lock down; if not locked
R down, push to lock. A force of approximately 75
R pounds may be required to lock gear down.
- R (11) Pull LEFT MAIN T-handle to stop; verify T-handle force
R does not exceed 42 pounds. Verify left MLG extends and
R locks.
- R (12) Pull RIGHT MAIN T-handle to stop; verify T-handle force
R does not exceed 42 pounds. Verify right MLG extends
R and locks.
- R (13) If landing gear inboard door interferes with tires and
R prevents full extension, repeat Step 6B(3). Slight
R tire scuffing of the door tab assembly is permissible.
- (14) Release all three T-handles by rotating handles 90
degrees and pushing in until stopped. Rotate handles
in opposite direction until they retract into normal
stowed position.
- (15) Verify that both phase control bypass valves and
landing gear control valve manual bypass valve have
returned to original (retracted) position (Ref. Fig.
503).
- WARNING: ENSURE THAT ALL THREE LANDING GEAR AREAS ARE CLEAR
OF PERSONNEL AND EQUIPMENT.
- (16) Turn on hydraulic system C pressure (Ref. 29-11-00).
- (17) Install both MLG downlock safety pins.
- R (18) Place LANDING GEAR control lever in UP position.
- R (19) Verify NLG moves to the up and locked position.
- R (20) Verify MLG doors open.
- (21) Deploy nose and bypass landing gear uplock mechanical
release handle.
- R (22) Verify the NLG moves down.
- R (23) Place LANDING GEAR control lever in DOWN position.
- (24) Verify the MLG doors do not fully close.

EFFECTIVITY: ALL



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NOTE: Doors may start to close.

- (25) Verify the hydraulic system C pressure dropped to approximately 2000 psi due to hydraulic bypass.

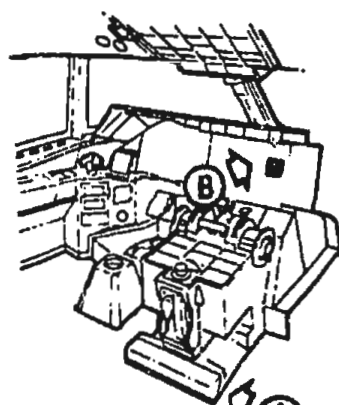
NOTE: If hydraulic system C pressure does not drop to approximately 2000 psi, the main bypass valve may be at fault.

- (26) Restore nose and bypass release handle to normal position.
- (27) Verify MLG doors are closed and hydraulic system pressure is increased to approximately 3000 psi.
- (28) Remove both MLG downlock safety pins.
- (29) Place LANDING GEAR control lever in UP position.
- (30) Verify all three landing gear move to the up and locked position.
- (31) Place LANDING GEAR control lever in NEUTRAL position. Verify all three landing gear remain in the up and locked position.
- (32) Place LANDING GEAR control lever in DOWN position.
- (33) Verify all three landing gear move to the down and locked position.
- (34) Install NLG and both MLG downlock safety pins.
- (35) If silicone oil was applied to rub strips, open MLG inboard door (Ref. 32-33-00), wipe off oil, and close doors.
- (36) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (37) Turn off electrical power (Ref. 24-00-00).
- (38) Lower aircraft and remove jacks.

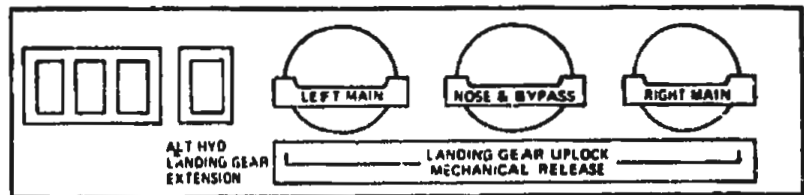
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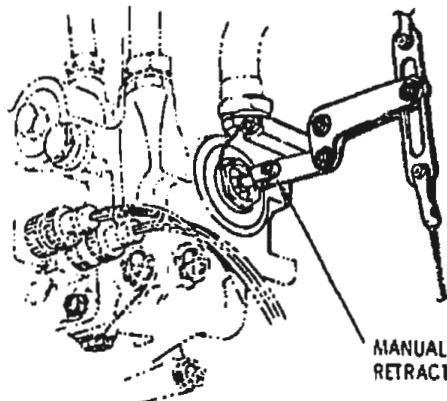
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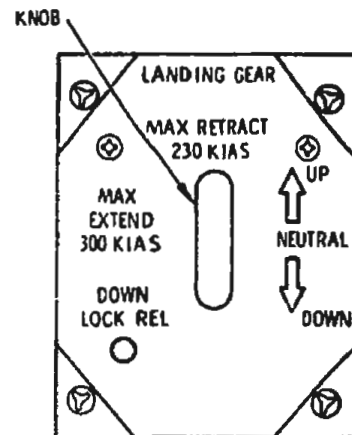
ZONE 210
FLIGHT STATION



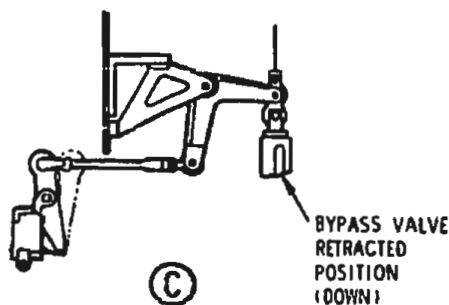
LANDING GEAR ALTERNATE MECHANICAL CONTROLS (T-HANDLES)



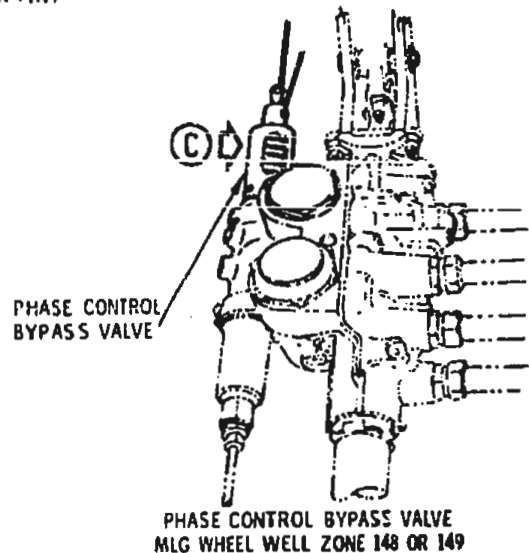
LANDING GEAR CONTROL MODULE
HYDRAULIC SERVICE CENTER
ZONE 147



LANDING GEAR CONTROL LEVER



(C)



PHASE CONTROL BYPASS VALVE
MLG WHEEL WELL ZONE 148 OR 149

M1-0100-32-439

Landing Gear Mechanical Alternate Extension System Controls and
Valve Positions
Figure 503

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32-37-00
Page 516
Mar 15/91



MAIN LANDING GEAR WHEELS AND TIRES -- DESCRIPTION AND OPERATION

1. General

Each main landing gear (MLG) is equipped with four identical wheel and tire assemblies. The wheels and tires are designed to withstand speeds up to 225 miles per hour.

2. Main Landing Gear Wheels

A. Description

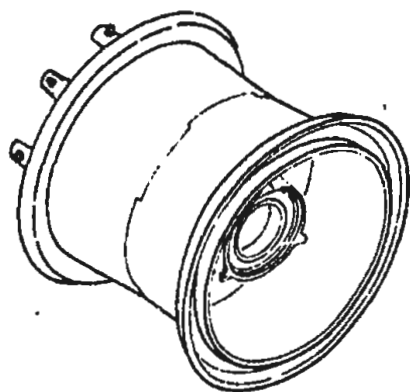
The MLG wheels, zones 731 and 741, are forged aluminum split assemblies designed for tubeless tires (Ref. Fig. 1). The wheel halves are held together with 18 bolts. A seal is installed in an annular groove in the inboard wheel half between the wheel bolts and the rim to prevent air leakage. Three pressure-relieving thermal fuse plugs are also provided in the inboard wheel half to prevent tire blowout in case of excessive pressure caused by heat. A tire inflation valve is provided in the outer wheel half. Opposite the inflation valve is an overinflation, frangible disc, pressure relief device that relieves at 325 to 375 psi.

Tapered roller bearings at the ends of the wheel hub carry the wheel load to the axle. The bearing cone and rollers seat in replaceable bearing cups which are pressed into the bearing bore. Inboard and outboard seals retain grease in the bearing areas and prevent entry of dirt and moisture. The inboard seal is held in place by a retaining ring, and the outboard seal is held in place by the axle nut.

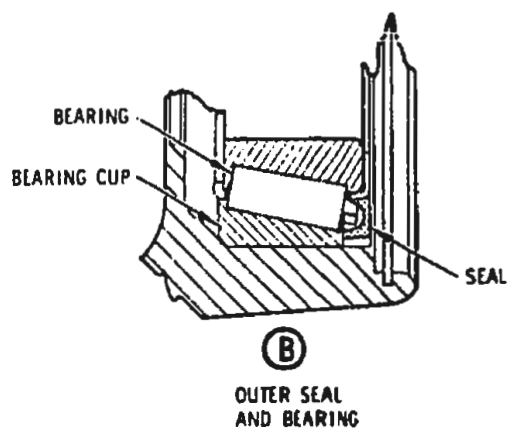
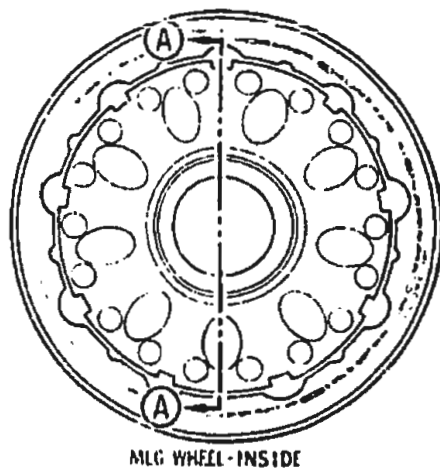
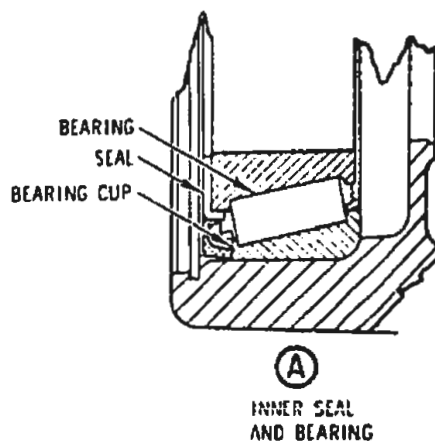
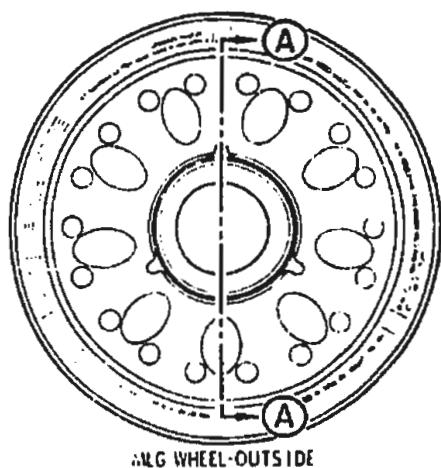
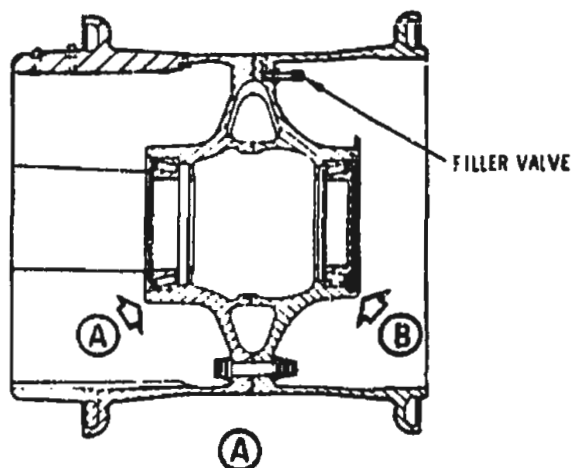
3. Main Landing Gear Tires

A. Description

LOCKHEED
MAINTENANCE MANUAL



MAIN LANDING GEAR WHEEL ASSEMBLY



HH 5243
M1-A00-32-079

Main Landing Gear Wheel
Figure 1

EFFECTIVITY: ALL

050B

32-41-00
Page 2
Dec 1/71

LOCKHEED
MAINTENANCE MANUAL

C CAUTION: NO INTERMIXING OF 50 x 20-20 AND 52 x 20.5-20
C TIRES BETWEEN DOMESTIC AND INTERNATIONAL L1011
C FLEETS IS ALLOWED.

CR On Domestic aircraft, the MLG mounts tubeless,
C reinforced tread 34 ply rated, 50 x 20 tires, each
C capable of carrying a maximum static load of
C 57,000 pounds.

CR On International aircraft, the MLG mounts
C tubeless, reinforced tread 36 ply rated, 52 x 20.5
C tires each capable of carrying a maximum static
C load of 62,500 pounds.

C NOTE: Reference Chapter/Section 12-14-01 for tire inflation
C pressure.

001B EFFECTIVITY: ALL

32-41-00
Page 3/4
Nov 15/84



MAIN LANDING GEAR WHEEL AND TIRE ASSEMBLY
REMOVAL AND INSTALLATION

1. Equipment and Materials

Axle Jack

Cotter Pin, MS 24665-153, or equivalent

Grease, Aeroshell 5, or equivalent

Low Adhesion Sealing Compound, LAC Spec C-40-769, Type II, or equivalent

MLG Sensor Protective Cap, PN BA31

MLG Axle (Wheel Change) Guard, PN BA87

MLG Axle Protector, PN BA41

MLG Brake Restrainer, PN BA90

MLG Torque Wrench Adapter, PN BA29

Torque Wrench

Wheel/Tire and Brake Change Dolly, PN STC11471-1, Spec Tool Co., or equivalent

2. Referenced Procedures

7-12-00 Axle Jacking - Maintenance Practices

12-14-01 Tire Inflation

20-51-04 Environmental Sealing of Model L-1011 Airplane
(PB75-425)

3. Removal/Installation

A. Removal

(1) Position axle jack and raise wheel and tire assembly until clear of ground (Ref. 7-12-00).

(2) Apply parking brakes.

LOCKHEED
MAINTENANCE MANUAL

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- (3) Deflate tire, unless tire and wheel are to be reinstalled.
- (4) Remove bolts and remove hubcap.
- (5) Remove axle nut locking bolt.
- (6) Loosen axle nut with MLG torque wrench adapter and 3/4-inch drive wrench.
- (7) Remove axle nut and outer spacer.
- (8) Position wheel/tire and brake change dolly so that tire is resting on dolly rollers (Ref. Fig. 401). Install chain.
- (9) Check for side load on wheel and remove outer seal and bearing.
- (10) Install MLG sensor protective cap.
- (11) Install MLG axle guard so that locking nut can be installed on protective cap stud.
- (12) Install MLG brake restrainer between brake torque link and opposite brake torque link.
- (13) Remove wheel and tire, ensuring that side loads on wheel are maintained at a minimum.
- (14) Remove axle guard and inner bearing. Inspect inner seal for wear and damage. If worn or damaged, remove and discard seal.
- (15) Inspect axle for crack, corrosion, and impact damage.
- (16) Inspect wheel for evidence of cracks and impact damage.
- (17) Inspect bearings for wear and damage.
- (18) Install MLG axle protector.

B. Installation

- (1) Ensure that brake rotor discs are aligned, then apply parking brake pressure if brake pressure is not already applied.
- (a) When changing a main wheel assembly or a main landing gear brake assembly, assure that axle inner-spacer and seal are installed properly prior

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EFFECTIVITY: ALL

001B

32-41-01
Page 402
Nov 15/84



MAINTENANCE MANUAL

C to installing inner bearing, wheel, bearing, outer
C seal, outer spacer, axle nut and hub cap.

CR CAUTION: IF AXLE INNER-SPACER AND SEAL ARE LEFT OUT, WHEEL
C WILL BE LOOSE AND INNER BEARING CAN MOVE TOWARD
C BRAKE ASSEMBLY, CAUSING SEVERE DAMAGE. THE
C HEAVIER FACE OF BEARING SPACER MUST BE FACING AWAY
C FROM WHEEL

(2) Remove MLG axle protector and install inner seal if removed.

CR (3) Ensure that inner bearing is packed with RONEX MP
CR grease, or equivalent, and install bearing.

(4) Lubricate outer brake-to-axle bushing through pressure
fitting on outboard side of brake assembly (Ref. Fig.
401). Use Aeroshell 7 grease or equivalent.

NOTE: The pressure fitting may not be installed. If
the pressure fitting is not installed, do not
remove the brake or attempt to lubricate the
bushing. Brakes are approved for continuous
service without the pressure fitting.

(5) Install MLG axle guard.

C CAUTION: THE HIGHER GROSS WEIGHT OF AIRCRAFT 025-026,
C 028-031 REQUIRES THAT CARE BE EXERCISED TO ENSURE
C THAT THE APPLICABLE WHEEL AND TIRE ASSEMBLY IS
C INSTALLED. FAILURE TO DO SO COULD RESULT IN
C ASSEMBLY DAMAGE.

CAUTION: ANY MIXTURE OR COMBINATION OF DIFFERENT NLG WHEEL
AND TIRE ASSEMBLIES AND MLG WHEEL AND TIRE
ASSEMBLIES OTHER THAN THE COMBINATIONS LISTED
BELOW IS NOT APPROVED FOR INSTALLATION ON THE SAME
AIRCRAFT.

CAUTION: ENSURE THAT APPLICABLE WHEEL AND TIRE ASSEMBLY IS
INSTALLED. FAILURE TO DO SO COULD RESULT IN
ASSEMBLY DAMAGE.

CAUTION: ON AIRCRAFT 001-033 WITH SB32-184,
WHEEL INSPECTION SCHEDULE AND PROCEDURES MUST BE
COMPLIED WITH ACCORDING TO B. F. GOODRICH SERVICE
BULLETIN 393.

(6) Position replacement wheel and tire assembly on
wheel/tire and brake change dolly and install chain.

(7) Adjust dolly to align wheel center with axle.

EFFECTIVITY: ALL

001B

32-41-01

Page 403
Nov 15/89

LOCKHEED
MAINTENANCE MANUAL

- (8) Install wheel on axle ensuring that bearing cup mates with bearing. Check that brake discs align with wheel.
- (9) Remove axle guard.
- (10) Ensure that outer bearing is packed with grease and install bearing.

C		L1011-1 DOMESTIC	
C		-----	
C		MAIN GEAR TIRE	NOSE GEAR TIRE
C		-----	
CR		50 x 20 -20/34PR	37 x 13-6/26 PR
C			(M070P78)
C		-----	

C NOTE: NO INTERMIXING OF TIRES BETWEEN FLEETS

C		L1011-50, -100 INTERNATIONAL	
C		-----	
C		MAIN GEAR TIRE	NOSE GEAR TIRE
C		-----	
C		52 x 20.5 -20/36PR	37 x 13-16/26PR
C		-----	

- (11) Inspect outer seal for wear and damage. Replace as required.
- (12) Remove MLG sensor protective cap. Lube axle threads with Aeroshell 7; Optional Parker O-lube. Install spacer and axle nut hand-tight.
- (13) Remove dolly.
- (14) Release parking brakes and torque axle as follows: Use MLG torque wrench adapter and torque wrench.

While rotating wheel:

- (a) Torque axle nut to 200 lb-ft.
- (b) Back nut off to zero torque.
- (c) In one continuous motion torque nut to 200 lb-ft.
- (d) Tighten nut to first lock position and install two locking bolts.

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NOTE: Ensure locking bolts are NOT installed in any of the axle nut wrench slots.

EFFECTIVITY: ALL

001B

32-41-01
Page 404
Nov 15/89

LOCKHEED
MAINTENANCE MANUAL

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Ensure locking bolts are installed with head up or to the outside of spacer.

CR

(e) Secure both locking bolts with nut and washer.

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NOTE: Ensure nuts have adequate self locking torque.

(15) Install hubcap.

(16) Inflate tire to recommended pressure (Ref. 12-14-01).

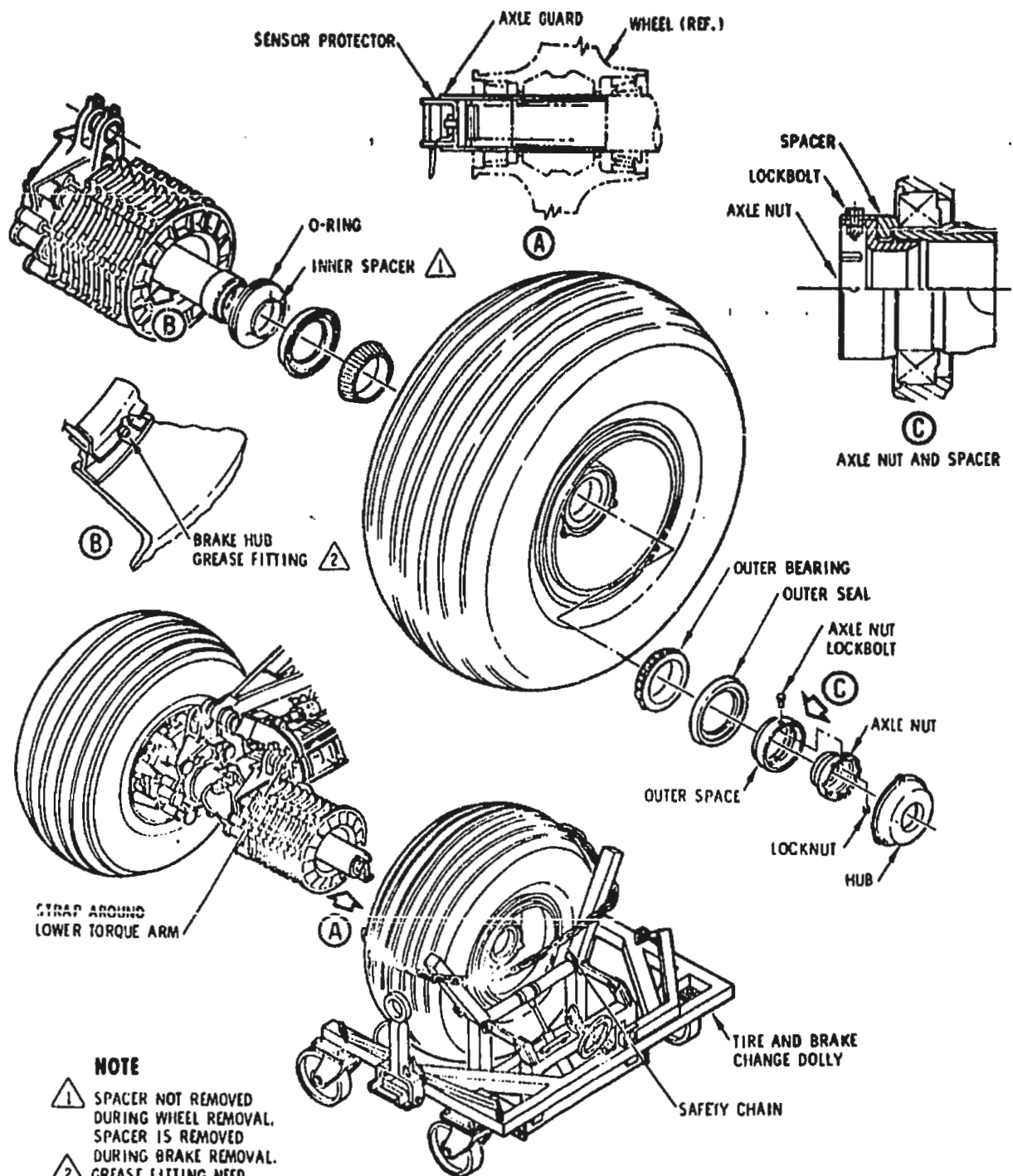
(17) Remove jack (Ref. 7-12-00).

EFFECTIVITY: ALL

001B

32-41-01
Page 405
Nov 15/89

LOCKHEED
MAINTENANCE MANUAL



M1-0004-32-094

**Main Landing Gear Wheel and Tire Assembly
Removal and Installation
Figure 401**

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EFFECTIVITY: ALL

32-41-01
Page 406
Nov 15/85

001B



C

TIRES - INSPECTION/CHECKC 1. General

C A. This section provides procedures for inspection and check of
C landing gear tires installed on airplane, and contains
C allowable limits and conditions which determine if tire is
C suitable for continuing in service.

C B. If Tires are flat spotted or blown due to locked wheel slide
C condition (not a tire structural failure) refer to 5-51-25
C to determine cause.

C 2. Equipment and Materials

C A. Wing and body gear door locks (Ref. 32-00-30).

C B. Nose gear door lock (Ref. 32-00-30).

C 3. Prepare for Inspection/Check

C A. Check that landing gear ground locks are installed (Ref
C 9-11-00) and wheels are chocked.

C B. Install main gear and nose gear door locks.

C WARNING: REFER to 32-00-30 FOR LOCK INSTALLATION PROCEDURE.
C RAPID ACTION OF DOORS MAY INJURE PERSONNEL OR DAMAGE
C EQUIPMENT IF LOCKS ARE NOT PROPERLY INSTALLED.

C 4. Examine Tires

CR A. Examine tires for leakage, abrasion, uneven wear, cuts and
C flat spots. Remove from service tires exhibiting the
C following conditions.

C (1) Cuts or weather checks in grooves, tread or sidewalls
C which reach cord body.

C (2) Blisters, bulges or other evidence of ply separation in
C tread on sidewall area.

C (3) Other damage or combination of items which might result
C in tire problems.

EFFECTIVITY: ALL

002B

32-41-01
Page 601
Dec 15/92



MAINTENANCE MANUAL

- C (4) Any tire with a flat spot through the reinforcing cords
C at the tread - undertread interface could be removed
C for service.
- C B. Examine tire for wear. The average tread depth should be at
C least 1/32 inch. The wear criteria can be relaxed at
C out-stations if there will be less than five landings before
C return to a main base. (Ref. Par. 5K)
- C (1) Examine rib tread tires.
- C (a) Remove from service when grooves nearest the
C center are still just visible, either locally or
C over full circumference of tire.
- C C. Check that tire pressure is within specified limit (Ref.
C 12-14-01, Servicing - Gaseous).
- C D. If a tire has been rolled flat (Ref. 12-14-01).
- C E. If inspection shows that a pressure loss was due to the
C melting or partial melting (extrusion) of the wheel thermal
C fuse, the tire should be removed from service. Also, all
C other main gear tire-wheels should be checked for evidence
C of melted, extruded, or leaking thermal fuses, especially at
C the tire-wheel positions with hot brakes.
- C F. If inspection shows that a wheel thermal fuse is partially
C melted (extruded) but not leaking, the tire-wheel should be
C checked for leakage prior to each flight until the
C tire-wheel is removed from service.
- C G. If a tire has been rolled flat, or if the tire-wheel has
C been removed due to an overheated wheel thermal fuse, the
C removal reason should be tagged to the wheel and the wheel
C should be inspected in accordance with the wheel vendor's
C service instructions.

C 5. Aircraft High Speed Tires

- C A. Enroute or Through Service Check and Maintenance Service
C Check
- C (1) The usage of the term "Enroute or Through Service
C Check" will mean a check during a daily flight program
C and for TWA consists of through service, turn around
C and other maintenance operation checks of less than two
C (2) hours duration. During these operation checks it
C is important to maintain flight schedules and it is
C better to continue using a tire even though continued

R EFFECTIVITY: ALL
R

002B

32-41-01
Page 602
Dec 15/92



MAINTENANCE MANUAL

- C use might risk causing the tire to become
C non-retreadable.
- C (2) The term "Maintenance Service Check" applies to a check
C that is performed on layovers where the down time is
C two (2) hours or more in duration.
- C B. The limits and conditions governing removal of tires from
C service are described as follows:
- C (1) Tires damaged or worn to the maximum "Through Service
C Check" limits must be noted in the Aircraft Flight Log
C and the specific damaged areas re-examined at each stop
C enroute.
- C (2) Regulations that apply to through service checks also
C apply to turn arounds and other maintenance operations
C of less than two (2) hours duration.
- C (3) A tire will be replaced immediately if the carcass cord
C ply fabric is cut or penetrated in excess of two plies
C unless otherwise specified in the following sections.
C On layovers of more than 2 hours duration, the tire
C will be replaced if any carcass plies are penetrated.
- C (4) Inspection of cuts must be accomplished with a smooth
C blunt instrument as a probe or by using Tire cut
C spreader tool TWA Stk. Nbr. 47-2263. See Tool and
C Equipment Manual, Chapter 32.
- C CAUTION: DO NOT USE A SCREW DRIVER UNLESS POINT IS GROUND TO A
C SMOOTH BLUNT CONTOUR.
- CR C. Tire Description and Nomenclature (fig. 601 and 602)
- CR (1) The tread patterned in accordance with aircraft
CR operational requirements and the tread rubber is
CR compounded for toughness and durability. The
CR circumferential ribbed pattern is widely used today
CR because it provides good traction under widely varying
CR runway conditions.
- CR (2) Tread reinforcement is one or more plies of reinforced
CR nylon fabric that strengthens the tread for high speed
CR operation. Used mainly for high speed tires.
- CR (3) The sidewall has a protective layer of rubber covering
CR the outer carcass ply, extending from thread edge to
CR bead area.
- CR (4) Breakers are not always used, these extra plies of
CR reinforcing nylon fabric are placed under the tread

EFFECTIVITY: ALL

32-41-01

Page 603
Dec 15/92



MAINTENANCE MANUAL

- CR rubber to protect carcass plies and strengthen tread
CR area. They are considered an integral part of the
CR carcass construction.
- CR (5) Carcass plies are plies of nylon fabric (running at
CR opposite angles to one another) which provide the
CR strength of a tire. Completely encompassing the tire
CR body, the carcass plies are wrapped around the wire
CR beads and back against the tire sidewalls (the "ply
CR turnups").
- CR (6) Beads are made of steel wires embedded in rubber, the
CR beads anchor the carcass plies and provide firm
CR mounting surfaces on the wheel.
- CR (7) Bead toe is the inner bead edge closest to the tire
CR center line.
- CR (8) Item (1) tread reinforcement will be found in retreaded
CR tires and in most designs of new tires. As the mass of
CR tread rubber diminishes (becomes worn) the need for
CR this fabric reduces. At times the fabric will rise
CR into the tread rib during curing of the tire, then it
CR will become visible before the tire reaches full wear.
CR Wear into the reinforcing fabric causing the fabric to
CR fray and a ragged look is seen in the centermost ribs.
CR This is not cause for an immediate removal. If this
CR condition occurs enroute or on a through service check,
CR then the tire should be set up for removal by the
CR Maintenance Coordinator on a layover or maintenance
CR check where sufficient time is available to avoid a
CR delay.
- C D. Circumferential cuts - penetration by a foreign object (Fig.
C 603)
- C (1) Enroute or Through Service Check:
- C A tire may continue to a maintenance point when cut is
C not more than 2 inches in length at the surface, not
C more than 2 carcass plies deep, not more than 1/8-inch
C wide, and not more than 1/2-inch diagonally wide.
- C (2) Maintenance Service Check:
- C On all maintenance checks, tire should be removed if
C one or more carcass plies are exposed, cut, or broken.
C This limit is established to assure retreadability of
C tire.
- C E. Diagonal cuts - penetration by a foreign object (Fig. 604)

EFFECTIVITY: ALL

32-41-01
Page 604
Dec 15/92



(1) Enroute or Through Service Check:

A tire may continue to a maintenance point if the cut is not more than 1/8-inch deep, not more than 1/8-inch wide, not more than 18 inches long, and does not extend across more than one tread rib.

(2) Maintenance Service Check:

On all maintenance checks, a cut to the maximum cut limits noted in the Enroute or Through Service Check may be accepted, only if the cut does not extend deeper than the base of the tread grooves. If the cut limits noted under Enroute or Through Service Checks are exceeded, immediate removal is required.

F. Transverse cuts (Fig. 605)

(1) Cut acceptability limits (Refer to "Tire Nomenclature").

(a) Cut "A" - Replace any tire cut to this limit prior to dispatching the aircraft for flight due to high possibility of peeling or stripping the rib for the full circumference.

(b) Cut "B" - On a through service check, a tire may continue to flight termination when cut to the maximum shown even though the cord plies are exposed and cut. (Refer to par. 5. B.).

(c) On all maintenance checks other than through service, a cut to the maximum shown may be accepted only if the carcass cord plies are not cut.

(d) Cut "C" - On a through service check, a tire may continue to flight termination if cut to the maximum shown.

(e) On all maintenance checks other than through service except that it shall not extend across more than one tread rib.

G. Transverse or radial cuts - penetration by a foreign object (Fig. 606).

(1) Enroute or Through Service Check:

(a) VIEW A - Tire may continue service if the cut is less than 1 inch long at the surface, less than



MAINTENANCE MANUAL

1/8-inch wide, and not more than 2 carcass plies deep.

(b) VIEW B - Tire may continue service if the cut is not more than 1/8-inch deep, does not extend across more than 1 tread rib, and the base of a groove is not cut.

(2) Maintenance Service Check:

(a) VIEW A - Tire cut to maximum limits noted in the Enroute or Through Service Check may continue service only if the carcass plies are not exposed, cut, or broken.

(b) VIEW B - Tire may continue service if cut limits noted in the Enroute or Through Service Check are not exceeded. Immediate removal is required if a cut is deeper than the base of tread grooves and extending from one groove to the next.

H. Instructions for use of tire cut spreading tool (Fig. 607):

(1) Align tips of jaws with the long dimension of the cut.

(2) Press jaws into the cut firmly with the palm of the hand.

(3) With the jaws imbedded in the cut, rotate the tool 90 degrees and squeeze handles together.

(4) With cut spread open examine for depth.

(5) If the cut has not exceeded the limits specified, the tire may remain in service.

I. Side wall cuts

(1) On a through service check, side wall cuts may be accepted to any length even though the cord plies are exposed [also refer to par. 5. B. (2) and (3)].

(2) On all maintenance checks other than a through service, side wall cuts may be accepted to any length providing the cord plies are not cut or broken.

J. Multiple cuts (Fig. 608).

(1) Any type of cut(s) such as circumferential, diagonal, or transverse that the wearing surface of a tire may receive.

R EFFECTIVITY: ALL

002B

32-41-01
Page 606
Dec 15/92



C (2) Enroute or Through Service Check:

C A tire may continue service if not more than three cuts
C in any 90 degree segment are within the maximum
C acceptable limits of the cuts noted under
C Circumferential Cuts, Diagonal Cuts, and Transverse or
C Radial Cuts. This is providing the cuts are a minimum
C of 8 inches apart from each other in a circumferential
C direction and a minimum of 8 inches apart in a diagonal
C or radial direction.

C (3) Maintenance Service Check:

C Limits are the same as noted in the Enroute or Through
C Service Check except any cuts that penetrate into the
C carcass plies are cause for the tire removal to assure
C retreadability.

C NOTE: A tire with a cut 1/32-inch deep or less in any
C direction and any length may continue service.

CR K. DELETED.

CR L. Tire Tread Wear (Fig. 609, 610, 611)

CR (1) Two types of tire tread designs could be found in TWA
C tire inventory:

C (a) A center groove tread design (odd number of
C grooves).

C (b) A center rib tread design (even number of
C grooves).

C (2) The center groove tire's wear removal limits are as
C follows:

C (a) On through flights - when the center groove is
C just starting to disappear. This is when the wear
C has reached the bottom of the center groove at any
C spot on the tread circumference. The tire must
C then be removed.

C (b) On overnight checks or checks where sufficient
C time exists for changes to preclude delays - when
C any spot in the center groove has reached or is
C down to 1/16 inch remaining depth, then change the
C tire.

CR (c) If a tire change due to tread wear will result in
CR a delay or cancellation, contact the MCI
CR Maintenance Coordinator. Tires with visible tread

EFFECTIVITY: ALL

32-41-01

Page 607
Dec 15/92



MAINTENANCE MANUAL

CR grooves can be operated to an appropriate station
 CR for removal, when approved by the Maintenance
 CR Coordinator in message form. As a planning
 CR guideline, an average tread depth of 1/32 inch
 CR should produce five (5) landings in normal
 CR operation. The Maintenance Coordinator will then
 CR set up tire removal accordingly. There cannot be
 CR any open or related flight items in relation to
 CR the subject tire (i.e. vibration, leaking, etc.).
 CR For tire wear not covered in the above guidelines,
 CR contact Engineering.

C (3) The center rib tire's wear removal limits are as
 C follows:

C (a) On through flights - when the two adjacent grooves
 C to the center rib reach zero (flush to the base of
 C the groove) in any location around the thread
 C circumference, change the tire.

C (b) On overnight or appropriate checks - when these
 C two grooves next to the center rib are down to
 C 1/16 inch depth remaining, change the tire.

CR (c) If a tire change due to tread wear will result in
 CR a delay or cancellation, contact the MCI
 CR Maintenance Coordinator. Tires with visible tread
 CR grooves can be operated to an appropriate station
 CR for removal, when approved by the Maintenance
 CR Coordinator in message form. As a planning
 CR guideline, an average tread depth of 1/32 inch
 CR should produce five (5) landings in normal
 CR operation. The Maintenance Coordinator will then
 CR set up tire removal accordingly. There cannot be
 CR any open or related flight items in relation to
 CR the subject tire (i.e. vibration, leaking, etc.).
 CR For tire wear not covered in the above guidelines,
 CR contact Engineering.

C (4) Figure 611 will show main gear tire treads with five
 C and six grooves at new and worn conditions. Some
 C operators do use four (4) groove center rib tires for
 C better wear performance and this tire is approved by
 C the FAA. It is possible to see some of these tires in
 C our system due to pool arrangements, special purchases,
 C loans, etc. However, the TWA philosophy is to minimize
 C hydroplaning by not restricting water passage and a
 C four groove main tire when worn will be approaching the
 C point of having only two grooves left while either of
 C the five or six groove tires will minimize to four
 C grooves at wear out.

EFFECTIVITY: ALL

002B

32-41-01
 Page 608
 Dec 15/92

LOCKHEED
MAINTENANCE MANUAL

NOTE: Nose gear tires have different requirements and will usually have three or four grooves (two less grooves than main gear tires).

M. Open tread splice (Fig. 612).

(1) An opening in the angled tread splice across one or more tread ribs.

(2) Enroute or Through Service Check:

An opening or gap not more than 1/8-inch wide, not more than 1/8-inch deep, and extending across no more than 2 ribs may continue service.

N. Alternate Depth Measurement (Fig. 613).

(1) In some cases where cuts or cracks are slender or it is late at night, determination whether carcass plies have been penetrated is very difficult. For this condition an alternate method may be used where a measurement is determined but is restricted to the tire crown area.

O. Puncture (Fig. 614).

(1) A hole penetrating through the tread into the carcass.

(2) Enroute or Through Service Check:

A tire with a hole penetrating through the tread into the carcass may temporarily continue service if the hole is not more than 1/8-inch in diameter and not cut through more than 2 plies on tires having 8 through 16 ply rating or 4 plies on tires having more than 16 ply rating. Tires with punctures in excess of these limits should be removed immediately.

(3) Maintenance Service Check:

Cuts described in Enroute or Through Service Check that penetrate into the carcass should be removed to assure retreadability.

P. Groove cracking - rib undercutting (Fig. 615).

(1) Groove cracking (view A) is a circumferential crack or split at the base of a tread groove. Rib undercutting (view B) is an extension of groove cracking extending under the tread rib.

(2) Enroute or Through Service Check:

R EFFECTIVITY: ALL

R
002B

32-41-01
Page 609
Dec 15/92



MAINTENANCE MANUAL

A tire with groove cracking less than 8 inches in length in any location may continue service if no more than one carcass ply is cut or broken. A tire with rib undercutting 1/4-inch or more under the rib must be removed.

(3) Maintenance Service Check:

A tire with any groove cracking with cut or broken carcass plies must be removed. A tire with rib undercutting over 1/8-inch under the rib must be removed.

Q. Tread flat spots (Fig. 616).

(1) On a through service check, a flat spot may be accepted for service if the minimum skid depth remaining is 1/32-inch and there are no flight remarks indicating wheel vibration.

(2) On all maintenance checks other than a through service, a flat spot may be accepted for six or more landings if the minimum skid depth remaining is 1/16-inch and there are no flight remarks indicating wheel vibration. (Plan tire replacement accordingly).

R. Tread splice separation (Fig. 617).

(1) Replace any tire displaying this condition prior to dispatching the aircraft for flight.

S. Sidewall separation - blister or bulge (Fig. 618).

(1) Blister or bulge in the sidewall area.

(2) Enroute or Through Service Check:

A tire with a condition as shown in drawing should be removed immediately.

(3) Maintenance Service Check:

A tire with a condition as shown in drawing should be removed immediately.

T. Tread rubber - skid (flat spots) (Fig. 619).

(1) Enroute or Through Service Check:

Tire may continue service if reinforcing plies are not exposed and if no excessive wheel vibration is indicated.

R EFFECTIVITY: ALL

32-41-01

Page 610
Dec 15/92

LOCKHEED
MAINTENANCE MANUAL

(2) Maintenance Service Check:

Tire may continue service if more than 1/32-inch skid depth is remaining and there are no flight remarks indicating wheel vibration.

U. Tread rubber reversion - ice skid burn (Fig. 620).

(1) An oval shaped area in the tread similar to a skid but where rubber shows burning due to hydroplaning during landing. Usually caused by wet or ice covered runways.

(a) During winter operation when runways and ramps are ice covered, aircraft tires will occasionally slide on ice in the locked wheel condition. If the locked wheel and tire are dragged along the ice for an extensive period of distance, the tread rubber in the footprint area, will melt away by friction induced heat.

(b) The appearance of two tires which have been ice-burned is shown in Fig. 620. The affected rubber in the footprint area is soft and gummy. The missing rubber was torn away after it became hot and soft enough to separate under wheel pressure. This condition is to be considered an operational problem and not a tire material or workmanship defect.

(c) Tires which have been ice-burned to the extent that one or more ribs are worn away should be removed from service. The mechanic removing the tire should check the "flat spot" square on the "M-237 Jet Tire Change Record" and add the words "ice-burn" next to the printed words "flat spot". Unless the carcass cords (not tread fabric) are exposed the tire should be returned for retreading. If carcass cord is exposed junk tire locally using TWA Form M-238.

(d) The serviceability of mild cases of ice-burn can be determined by existing maintenance regulations governing flat spots and permissible tread wear.

V. Ozone and/or weather checking (Fig. 621).

(1) Random pattern of shallow sidewall cracks, usually caused by age deterioration, prolonged exposure to weather and improper storage.

(2) Enroute or Through Service Check:

R EFFECTIVITY: ALL

32-41-01
Page 611
Dec 15/92

002B



MAINTENANCE MANUAL

Any length is acceptable. Tire may temporarily continue in service if carcass plies are exposed. If any cords are cut or broken, remove tire immediately.

(3) Maintenance Service Check:

A tire must be removed if sidewall cracks or cuts expose carcass plies.

NOTE: Tire is serviceable only if weather checking condition does not expose carcass plies.

W. Tread flaking, chipping, and chunking (Fig. 622).

(1) Tread chunking (view A) is a pock-marked condition in the wearing portion of the tread, usually due to rough or unimproved runways. Tread flaking and chipping (view B) are thin gauge pieces of rubber which have chipped or flaked from wearing portion of the tread. Often they are rubber pieces from rib edges off the fabric reinforcement.

(2) Enroute or Through Service Check:

For tread chunking, the tire may continue service if pock-marks do not extend across a rib or to the base of grooves. For tread flaking and chipping, tire may continue service if condition has not caused groove cracking down to carcass.

(3) Maintenance Service Check:

For tread chunking, removal is required if pock-marks extend across or to the base of a rib. For tread flaking and chipping, removal is required if condition has caused groove cracking to carcass plies or to 1/8-inch below bottom of groove.

X. Chevron tearing or cut pattern on aircraft tires (Fig. 623 and 624).

(1) Chevron tearing or wide angle "V-shaped" cuts are reappearing on our aircraft tires. This cut pattern may be found in a tire footprint area mainly over the center ribs on all main tires and with all manufacturers.

(2) Shallow cross cut grooves in the runways at several airports which improve the aircraft's braking and stopping distances under wet conditions are the cause of chevron cuts. The cuts occur when (1) the aircraft touchdown is directly on the cross grooved pavement,

R EFFECTIVITY: ALL

002B

32-41-01
Page 612
Dec 15/92



MAINTENANCE MANUAL

(2) heavy braking occurs directly over the grooving, or
(3) anti-skid malfunction (or any wheel locked
situation) occurs over the grooves in the runway.

(3) The chevron cut or scuff pattern is not a reason to
remove the tire from service unless the cut or break is
continuous across the complete width of the rib and
greater than .25 inch in depth or if the non-continuous
cuts are down to the first carcass ply. Chevron cuts
such as those in figure are not detrimental and can
remain in service.

Y. Circumferential cracking (Fig. 625).

(1) A cracking condition usually found in the lower
sidewall area.

(2) Enroute or Through Service Check:

A tire with any number or length of cracks may
temporarily remain in service so long as the depth of
any one crack is not deeper than one carcass ply.

(3) Maintenance Service Check:

A tire must be removed if sidewall cracks or cuts
expose carcass plies.

NOTE: Tire is serviceable only if sidewall cracks or
cuts do not expose carcass plies.

Z. Radial cracks (Fig. 626).

(1) Cracks in the sidewall or shoulder area.

(2) Enroute or Through Service Check:

Any length is acceptable. Tire may temporarily
continue in service if carcass plies are exposed. If
any cords are cut or broken, remove tire immediately.

(3) Maintenance Service Check

A tire must be removed if sidewall cracks or cuts
expose carcass plies.

NOTE: Tire is serviceable only if sidewall cracks or
cuts do not expose carcass plies.

AA. Tread Separation - blister or bulge (Fig. 627).

R EFFECTIVITY: ALL

002B

32-41-01
Page 613
Dec 15/92



MAINTENANCE MANUAL

(1) A void (view A) of rather large area of separation (view B) within the tread rubber or between components of the tread area.

(2) Enroute or Through Service Check:

Immediate tire removal for either condition shown in views A & B.

(3) Maintenance Service Check:

Immediate tire removal for either condition shown in views A & B.

AB. Thrown tread - peeled rib (Fig. 628).

(1) A thrown tread (view A) is a partial or complete loss of tread down to the fabric tread ply, under tread layer, or the carcass. A peeled rib (view B) usually begins with a cut or defect in the tread, resulting in a circumferential stripping of a tread rib, partially or totally to tread fabric or carcass.

(2) Enroute or Through Service Check:

Immediate tire removal for either condition shown in views A & B.

(3) Maintenance Service Check:

Immediate tire removal for either condition shown in views A & B.

AC. Bead damage

(1) A tire which contains bead area damage caused by heat or by abuse which exposes the fabric cord must be replaced prior to dispatching the aircraft for flight.

NOTE: For additional tire bead information see Paragraph "Bead Wire Failure".

AD. Repetitive pressure loss

(1) When diffusion through tire wall or other causes may affect repetitive low tire pressure as noted during daily checks the following limit may be applied to determine tire serviceability.

(a) If tire pressure loss exceeds 4% of the elevated inflation pressure within one hour after the tire

R EFFECTIVITY: ALL

32-41-01
Page 614
Dec 15/92

002B



has been inflated to 10% above the normal tire inflation pressure, the tire must be changed.

AE. Tire mis-match limits

- (1) Limits to be maintained at each Base Overhaul are as follows: The diameters of two tires on any one M.L.G. axle must match within one inch. Nose tires must match within one-half inch diameter. Both tires on a M.L.G. axle or a NLG axle should have the same tread design and similar wear if practical - to maintain equal brake torques and to reduce tendency for NLG shimmy.
- (2) Field stations are not held to the above mismatch requirements. Since it is not good economics to jeopardize field inventory, produce numerous premature removals and prevent replacement of worn tires singularly.

AF. Tire mounting procedure

- (1) When tires are being mounted on wheel, the tire should be mounted with its serial number on the outer (hub) side of the wheel assembly. This will facilitate checking tire identification on installed wheel assemblies since normally all identity is on the same sidewall with the serial number.

AG. Bead Wire Failure

- (1) There have been several tire failures which resulted from the bead wires working loose and coming out of the tire thru the sidewall or bead area of the tire.
 - (a) When the bead wire bundle begins to fail, the individual wires (approximately .040 inch diameter steel) may break away from the bead wire bundles and tear or separate the body plies. When a bead wire is noticed protruding from a tire, the condition may indicate oncoming failure of the tire.

1) At any time, when tires are found with a protruding bead wire that tire must be replaced prior to further flight.

AH. Tubeless tire vent holes (Fig. 602).

- (1) This is to advise personnel, who may be unfamiliar with tubeless tire construction, that a small amount of air leakage through the sidewalls is a normal condition with tubeless tires. The tires are vented in the

R EFFECTIVITY: ALL

002B

32-41-01

Page 615
Dec 15/92



MAINTENANCE MANUAL

sidewall to permit air, which has seeped through the inner liner, to escape before it results in carcass separation. On some tires the vent holes are marked by a circle of white paint around each hole. Refer to illustration.

(2) If soapy water or "Ruglyde" is applied over a vent hole, the normal amount of escaping air will be evidenced by small bubbles (approximately 1/8" diameter) forming and breaking continuously on the bleed hole. Large bubbles (the size of marbles) forming and breaking very rapidly indicate excessive leakage.

(3) In any case, when excessive leakage is suspected, the tire and wheel assembly should be checked for proper air retention for at least 24 hrs.

(4) When it has been determined that a tire (and not the wheel seal) is leaking excessively, the tire should be tagged, "leaking excessively through bleed holes" and returned to MCI for examination and logging.

AI. Tubeless tire inflation procedures. Air loss test standards and allowable limits of leakage.

(1) Install the valve core and inflate with just enough air pressure to seat the tire beads against the rim flanges. Dual inflation is not necessary for tubeless tires. If the demountable flange is seated properly and/or the wheel tie bolts and nuts are satisfactory, continue inflation to operating air pressure.

(2) The following tests can be used for making air retention checks:

(a) 24 hour test (especially for new tires): Inflate tire to rated pressure. Record time, pressure and temperature. Allow tire to set for 12 hours. Reinflate to rated pressure. Record time, pressure and temperature. Initial 12 hour stretch conditioning may result in a 3% to 5% drop in air pressure. Allow tire to set for another 12 hours. Check and record pressure and temperature. The pressure loss shall not exceed 5% during the second 12 hour period.

(b) Alternate 8 hour test (especially for used tires): (To be used only when time limits preclude use of 24 hour test). Inflate tire to rated inflation pressure. Record time, pressure and temperature. Allow tire to set for 8 hours. Record pressure

R EFFECTIVITY: ALL

R
002B

32-41-01
Page 616
Dec 15/92



MAINTENANCE MANUAL

and temperature. Pressure loss shall not exceed 5%.

(c) Alternate one (1) hour rest. (To be used only where time limits preclude use of 8 hour test or 12 hour test). Inflate tire to 10% over the recommended or service pressure and check after one hour. Pressure loss should not exceed 4%.

(3) In service the air pressure drop will normally be a maximum of 3% for any 24 hour period.

(4) Should the air pressure drop more than 3% for any 24 hour period, then the following points should be checked for leaks:

(a) Check valve core.

(b) Check stem and base.

(c) Check bead base and bead area for foreign material, cuts and cracks, exposed cord and other defects and damage.

(d) Check liner of tire for defects and damage such as cuts and cracks, splice separation, blisters, holes, etc.

(e) Check crown of tire for puncturing objects such as glass, nail, screws, etc.

(5) In making a positive check for leakage, paint tire with a soapy solution. Continuous seepage showing up in the form of small bubbles at a very slow rate in the vent holes is not a basis for rejection. All tubeless tires will seep air at a slow rate at the vent holes. This is a normal condition. Should the tire show leakage at a fast rate with large bubbles then the tire has been damaged or is defective.

(6) Should tire show no leakage other than that considered normal as per above, then leakage is probably due to one or a combination of factors shown below:

(a) Wheel porosity.

(b) Wheel defect or damage.

(c) "O" ring or gasket leakage due to design, damage or mis-alignment.

(d) Loose or damaged drive key or plate screws.

R EFFECTIVITY: ALL

002B

32-41-01

Page 617
Dec 15/92



MAINTENANCE MANUAL

- (7) In making the above checks, leakage may be determined by immersion of tire and wheel assembly in water.
- (8) Should no leakage be evidenced from (6) and (7) above, then air loss may be due to:
- (a) Low ambient temperatures and their effect on wheel shrinkage and "O" ring or gasket operation.
 - (b) Movement between wheel halves during rolling.
 - (c) Tire leakage during rolling.
- (9) If air pressure does not drop below allowable limits install valve cap. Every valve should have a valve cap installed and screwed on firmly with finger pressure. The cap prevents dirt, oil, and moisture from entering the valve and damaging the core. It also seals air and serves as protection should a leak develop in the valve core during operation.

AJ. Jet tire change record procedure (Fig. 629 and 630).

- (1) Jet Tire Change Record Form M-237 must be completed at each jet tire change.
- (a) The mechanic in the Tire-Wheel Build-Up Shop will at the time the tire is mounted, complete the section under installed tire and attach the card record to the Form M-215 using the tag wire of the M-215.
 - (b) The mechanic installing the wheel and tire assembly on the airplane will complete all remaining sections and mail the completed form to the address on the back of the form.
- 1) If for some reason Form M-237 is not attached to the new wheel assembly, forms are available at the local station. In this case the mechanic installing the wheel and tire assembly on the airplane must complete the entire form.
- 2) The mechanic who checks the reason for removal will also indicate the date, station, and flight number; during which the tire was removed.

NOTE: The form M-237 does not supersede or cancel any existing forms or procedures.

R EFFECTIVITY: ALL

002B

32-41-01
Page 618
Dec 15/92

LOCKHEED



MAINTENANCE MANUAL

(c) The following tire identification sketches (Fig. 630) are provided to aid in completing Form M-237.

1) Check "Flat Spot" only if tire is flat spotted and remaining skid depth in center grooves elsewhere on tire is greater than 3/32-inch. If tire is flat spotted but is also generally worn (less than 3/32-inch center groove skid depth around the tire) check the "Normal Wear" block.

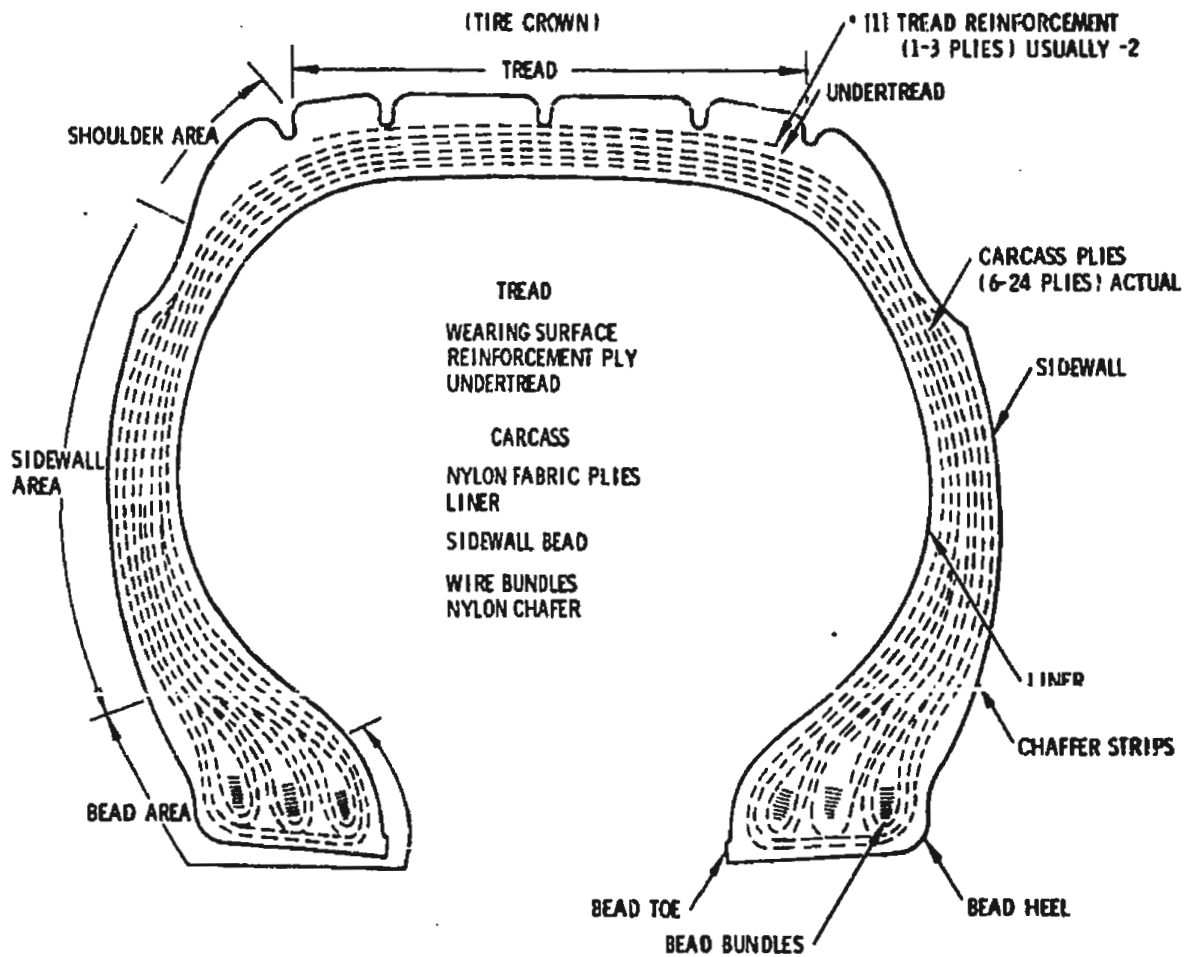
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002B

32-41-01
Page 619
Dec 15/92

LOCKHEED
MAINTENANCE MANUAL



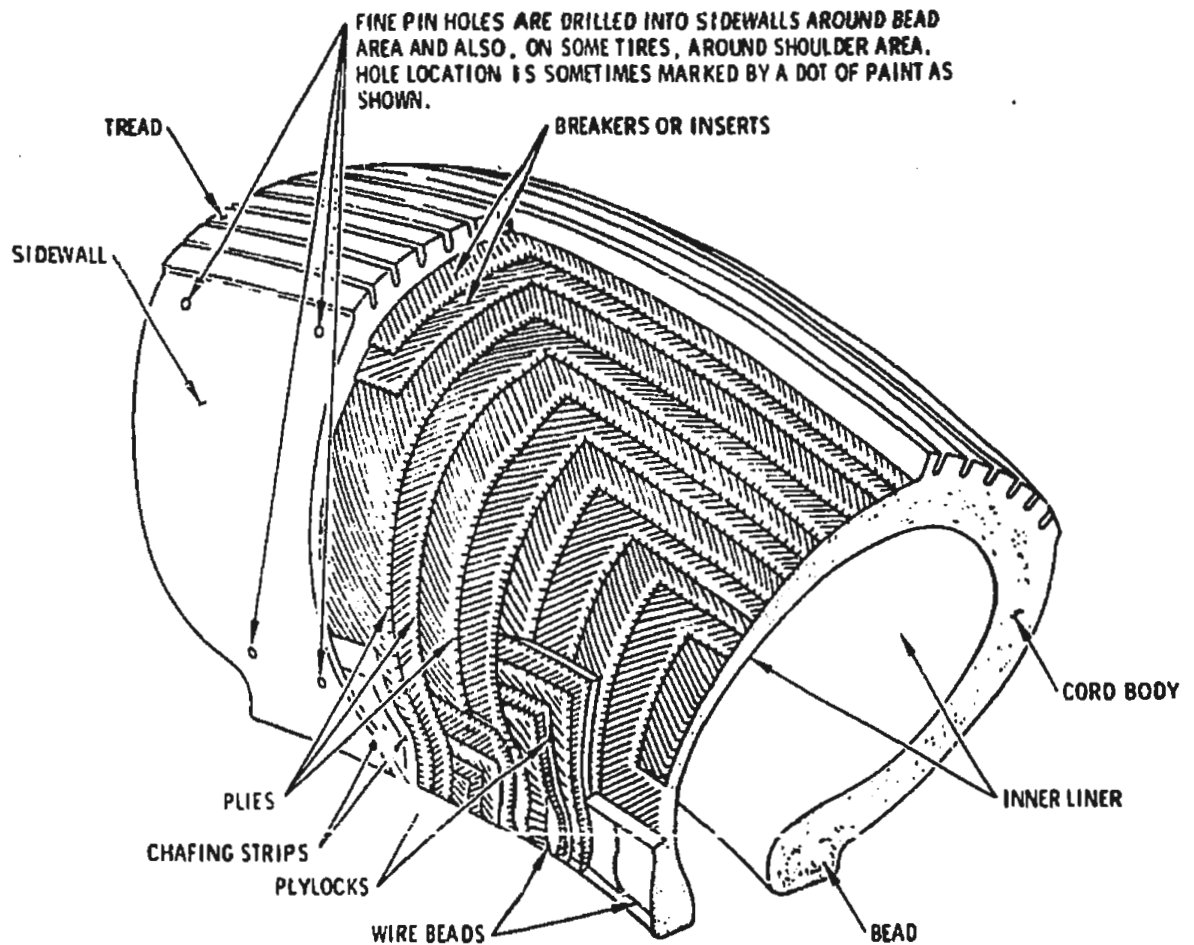
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Tire Nomenclature (Typical)
Figure 601

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EFFECTIVITY: ALL

32-41-01
Page 620
Dec 15/92



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C Cut-Away View Showing Construction of Conventional Tubeless Tire
C Figure 602

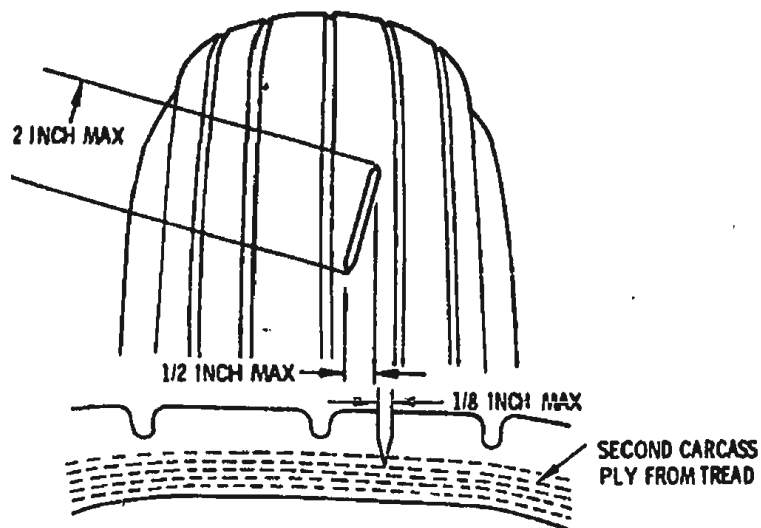
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32-41-01
Page 621
Dec 15/92

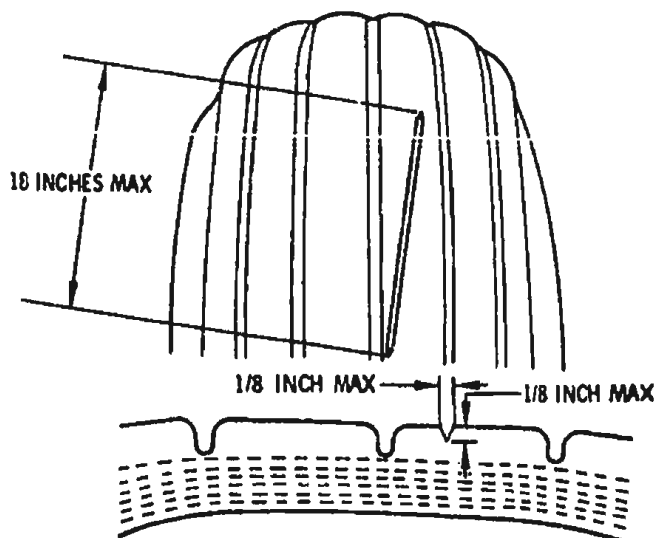
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MAINTENANCE MANUAL



CIRCUMFERENTIAL CUTS - PENETRATION BY A FOREIGN OBJECT
FIGURE 603



M1-0001-32-732

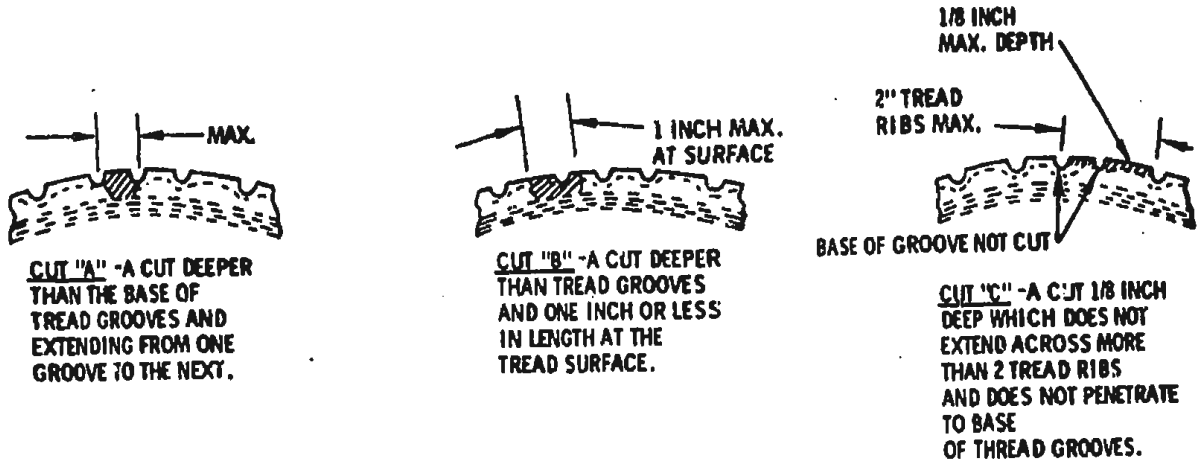
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Diagonal Cuts - Penetration by a Foreign Object
Figure 604

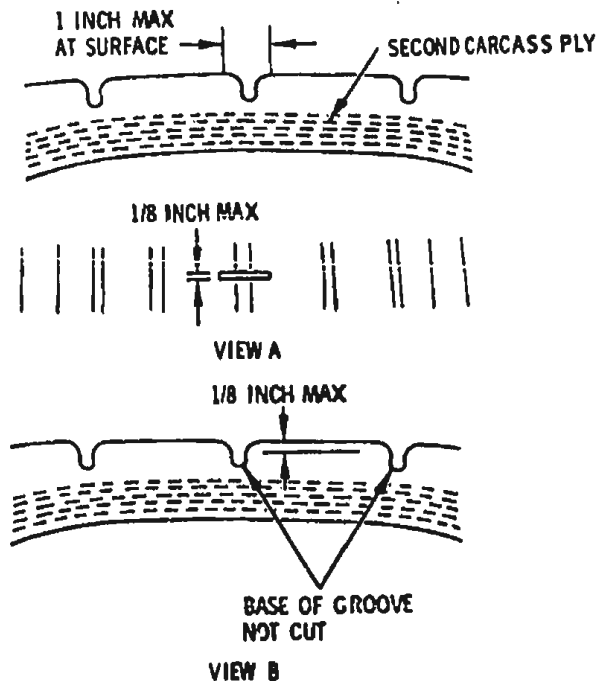
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32-41-01
Page 622
Dec 15/92



TRANSVERSE CUTS
FIGURE 605



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Transverse or Radial Cuts - Penetration by a Foreign Object
Figure 606

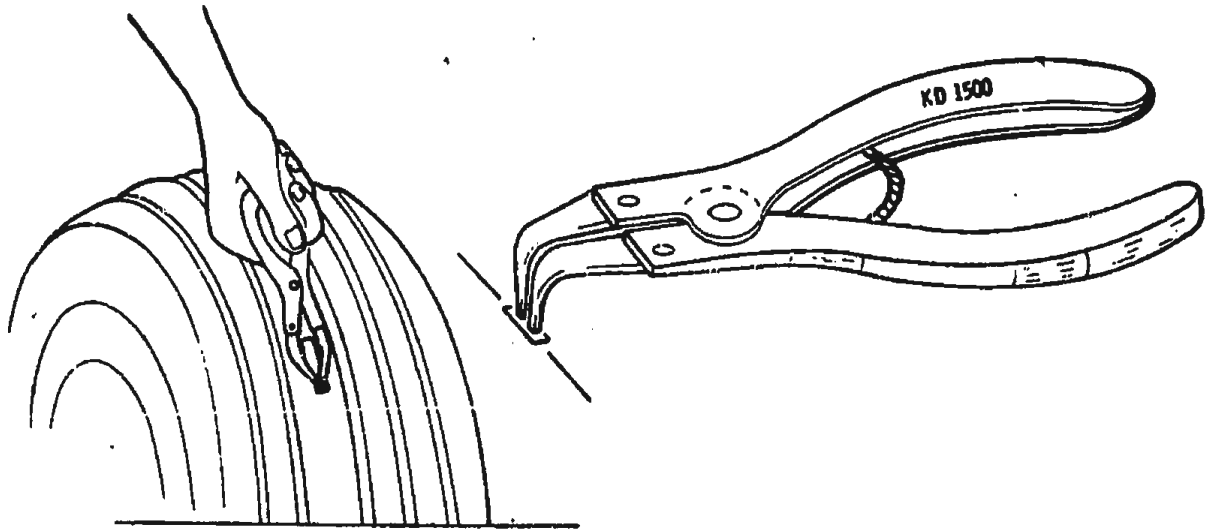
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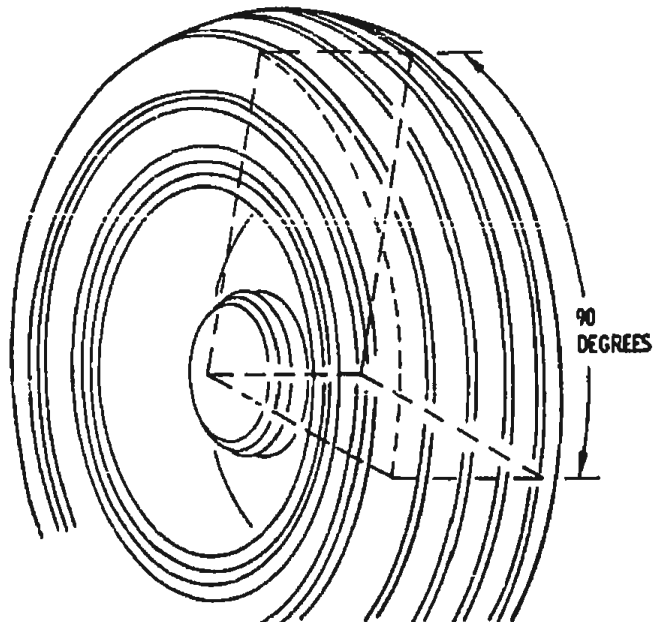
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32-41-01
Page 623
Dec 15/92

LOCKHEED
MAINTENANCE MANUAL



TIRE CUT SPREADING TOOL - TWA STK. NBR. 47-2263
FIGURE 607



Mutiple Cuts
Figure 608

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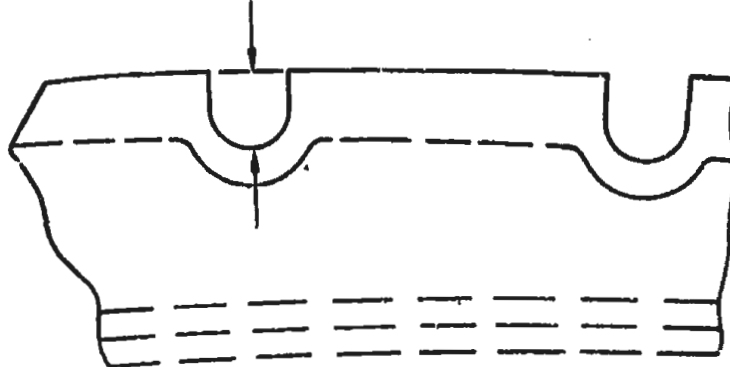
32-41-01
Page 624
Dec 15/92

LOCKHEED

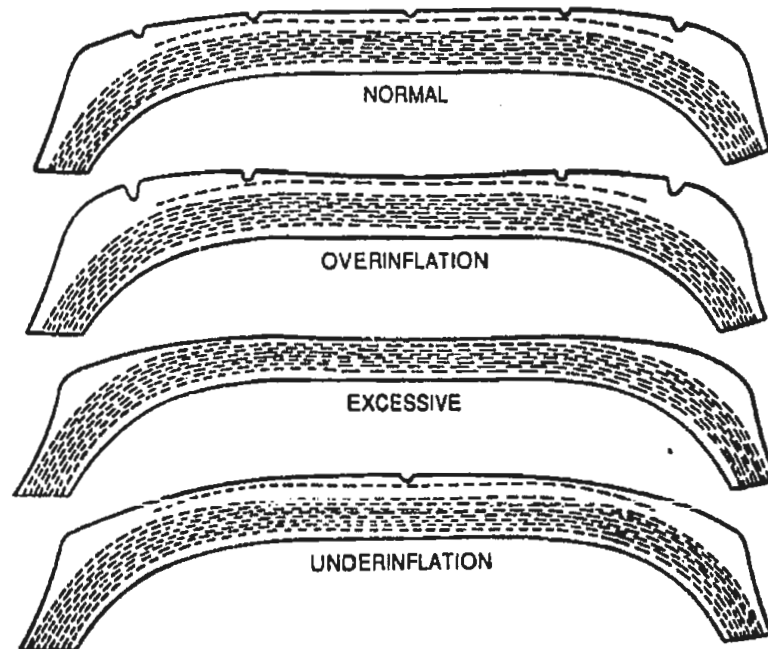


MAINTENANCE MANUAL

SKID DEPTH MEASURED
AT CENTER GROOVES(S)



TREAD WEAR
FIGURE 609



M1-0002-32-738

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Tread Wear
Figure 610

EFFECTIVITY: ALL

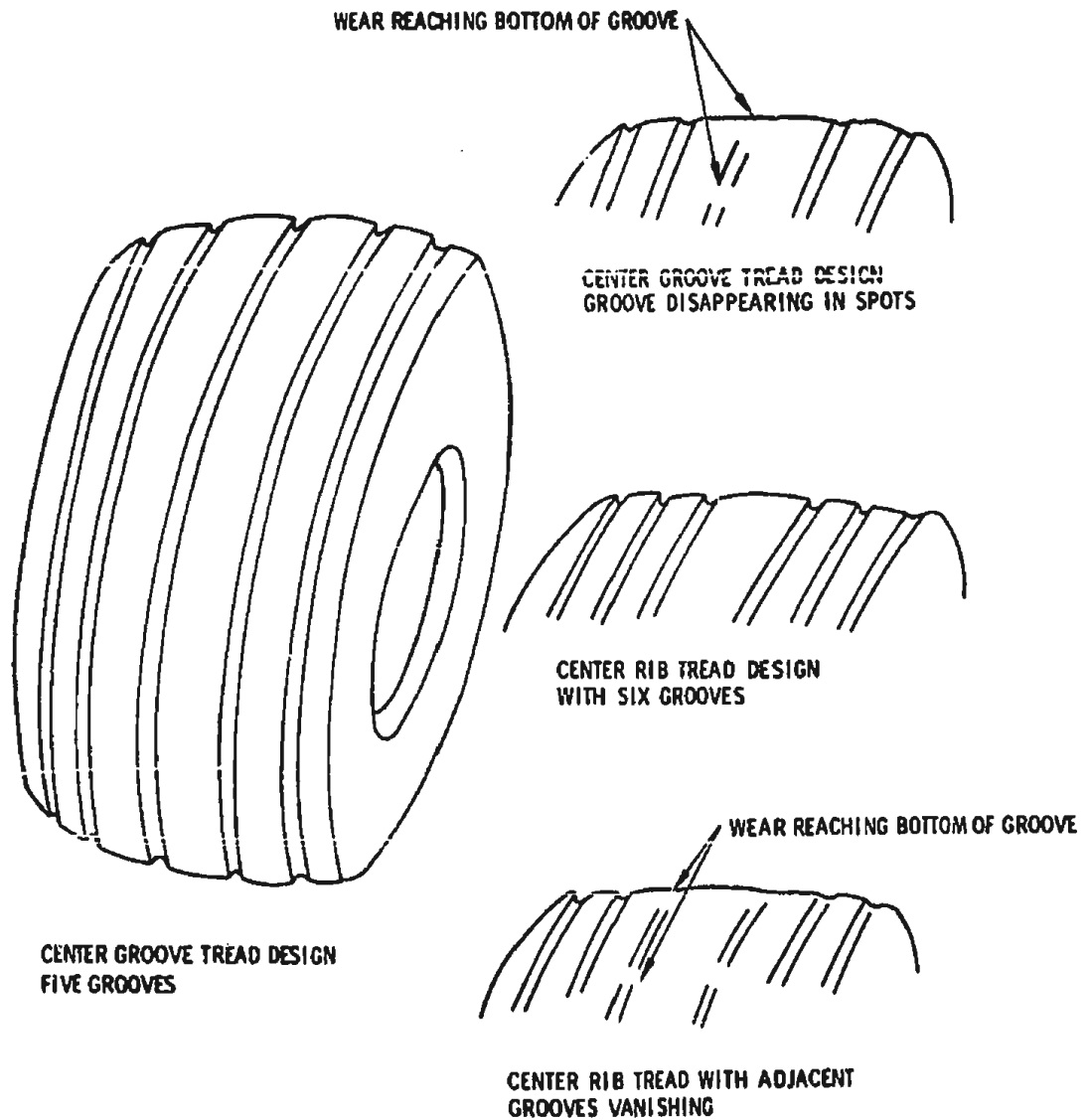
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32-41-01
Page 625
Dec 15/92

LOCKHEED



MAINTENANCE MANUAL



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Tire Tread Design
Figure 611

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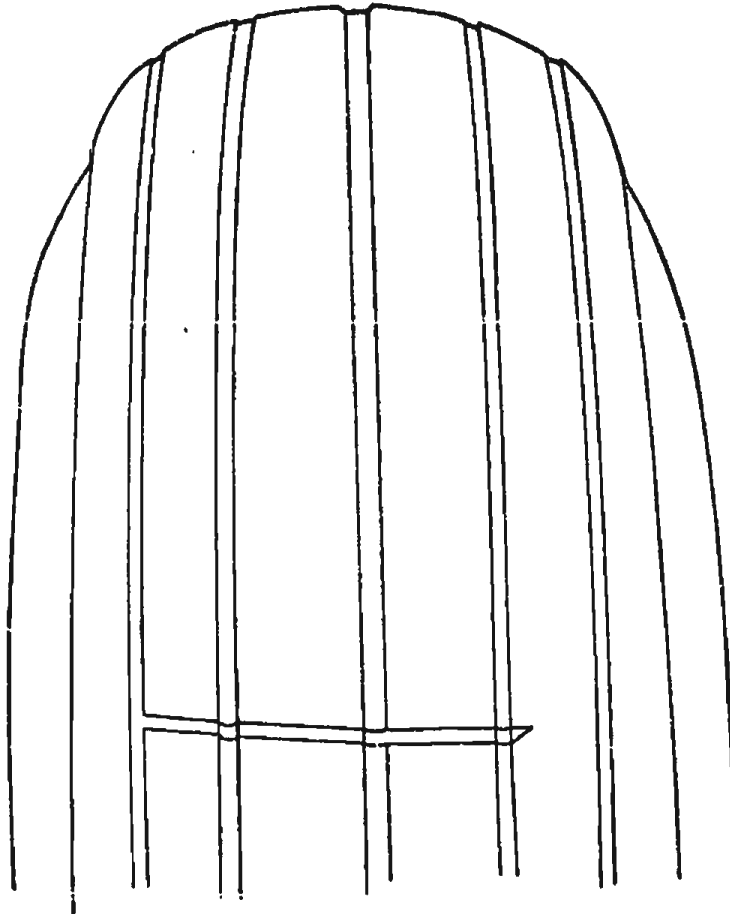
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32-41-01
Page 626
Dec 15/92

LOCKHEED
MAINTENANCE MANUAL



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Open Tread Splice
Figure 612

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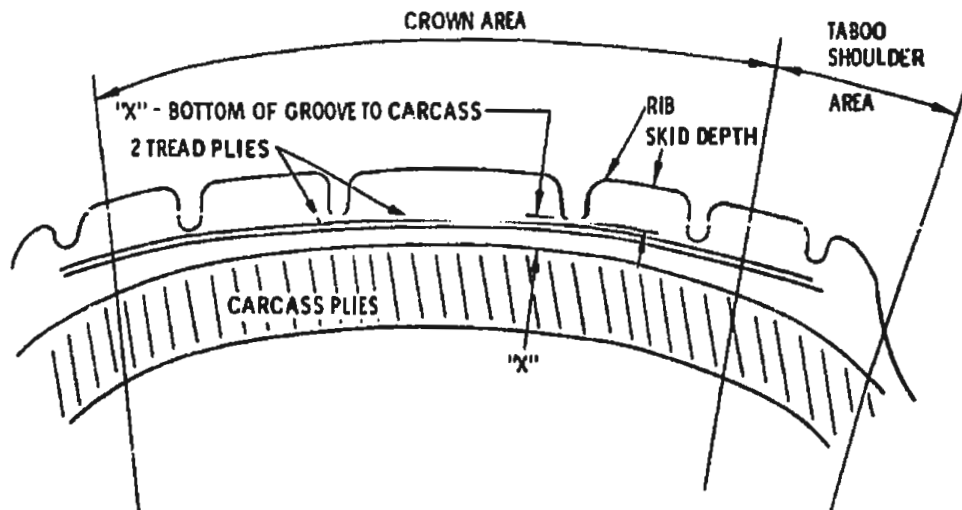
32-41-01
Page 627
Dec 15/92

LOCKHEED
MAINTENANCE MANUAL

TABLE FOR CUT DEPTH DETERMINATION

TIME FOR CHECK	TIRE	CUT IN:	SKID DEPTH	"X" DIM.	TWO PLIES	ALLOWABLE VERTICAL DEPTH OF CUT
LESS THAN 2 HOURS	{ MLG MLG	RIB GROOVE	• [1] 0	5/16" 5/16"	3/32" 3/32"	• [1] + 13/32" 13/32"
2 HOURS OR MORE	{ MLG MLG	RIB GROOVE	• [1] 0	5/16" 5/16"	0 0	• [1] + 5/16" 5/16"

NOTE: FOR NLG TIRES "X" DIMENSION EQUALS 1/4 INCH.



* [1] MEASURE DEPTH OF CIRCUMFERENTIAL TREAD GROOVE NEAREST TO CUT OR CRACK.

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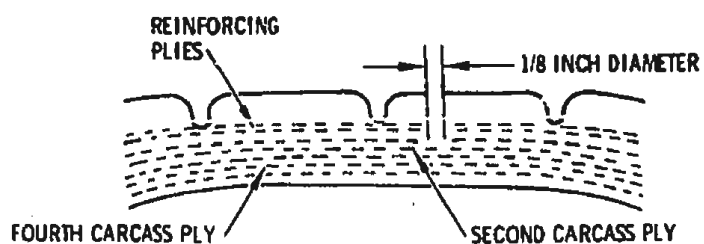
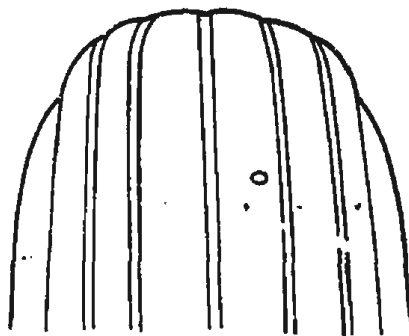
Alternate Depth Measurement
Figure 613

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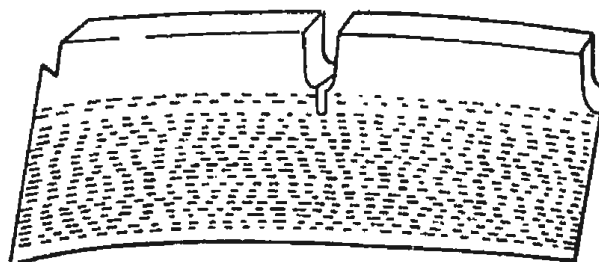
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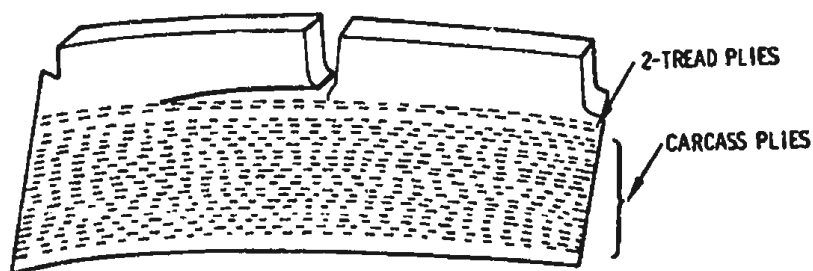
32-41-01
Page 628
Dec 15/92



PUNCTURE
FIGURE 614



VIEW A



VIEW B

M1-0001-32-742

Groove Cracking - Rib Undercutting
Figure 615

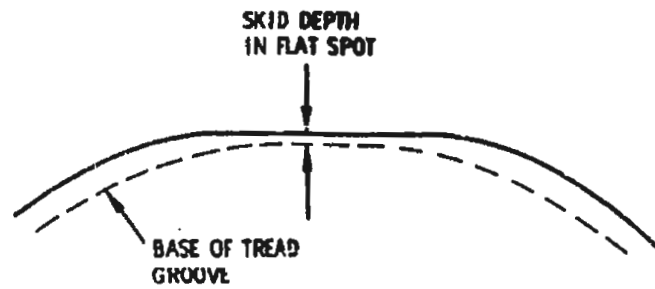
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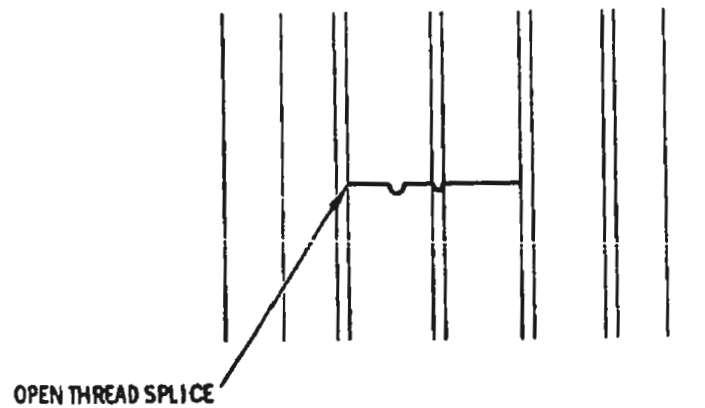
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32-41-01
Page 629
Dec 15/92

LOCKHEED
MAINTENANCE MANUAL



TREAD FLAT SPOTS
FIGURE 616



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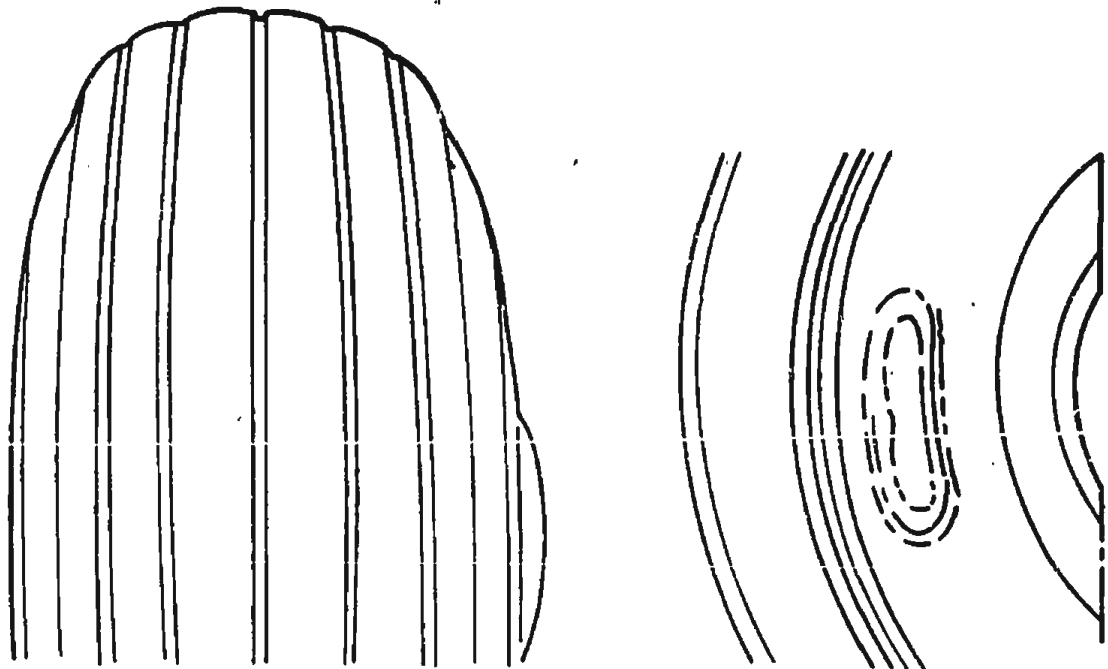
Tread Splice Separation
Figure 617

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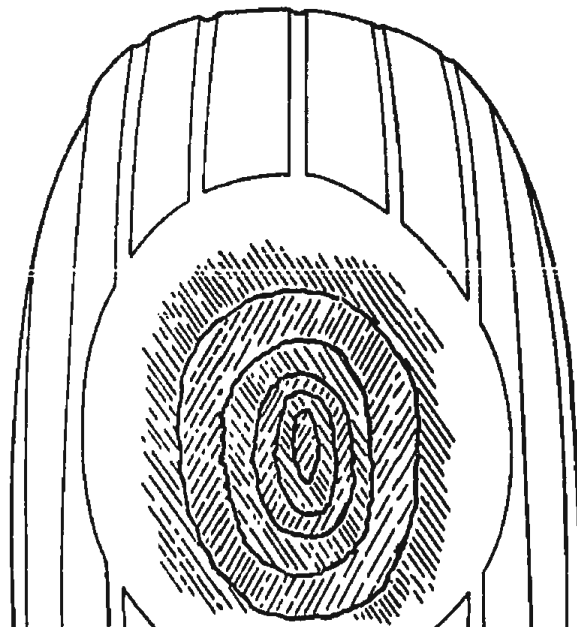
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32-41-01
Page 630
Dec 15/92

LOCKHEED
 MAINTENANCE MANUAL



SIDEWALL SEPARATION BLISTER OR BULGE
 FIGURE 618



FLAT SPOT

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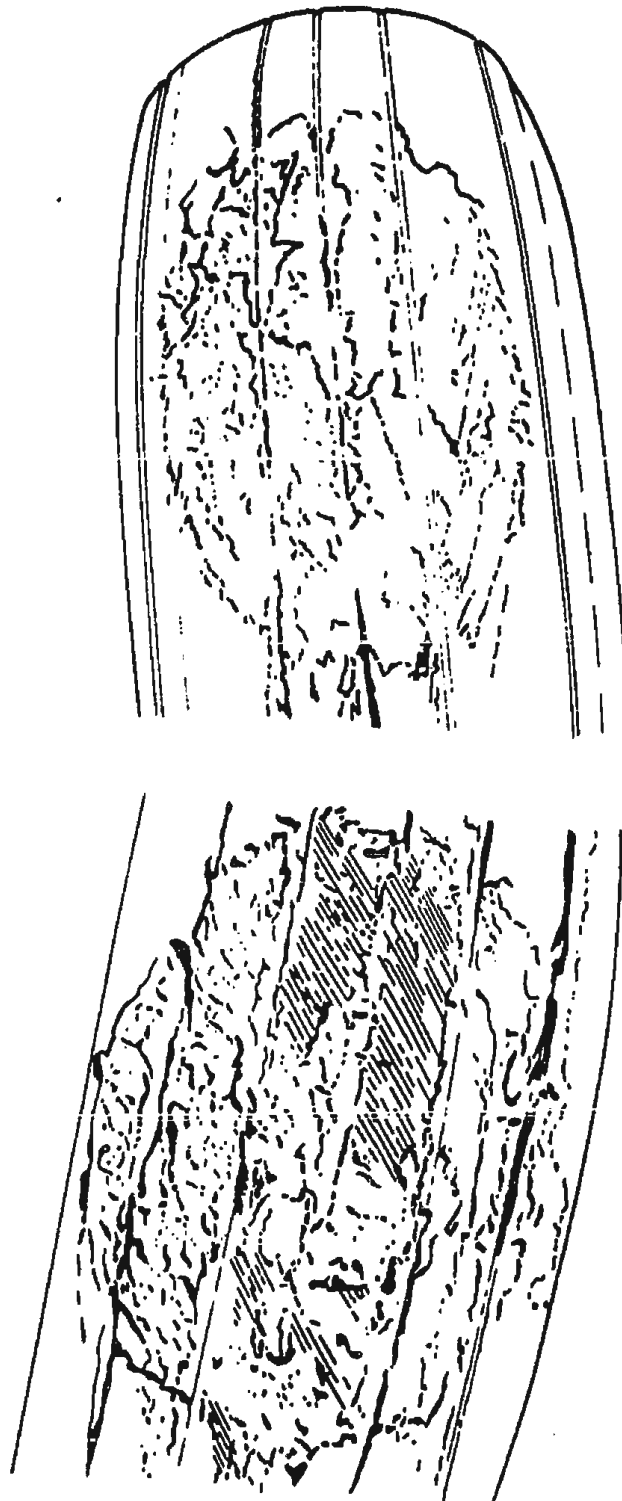
Tread Rubber Skid (Flat Spots)
 Figure 619

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32-41-01
 Page 631
 Dec 15/92

LOCKHEED
MAINTENANCE MANUAL



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Ice Skid Burns - Tire Tread
Figure 620

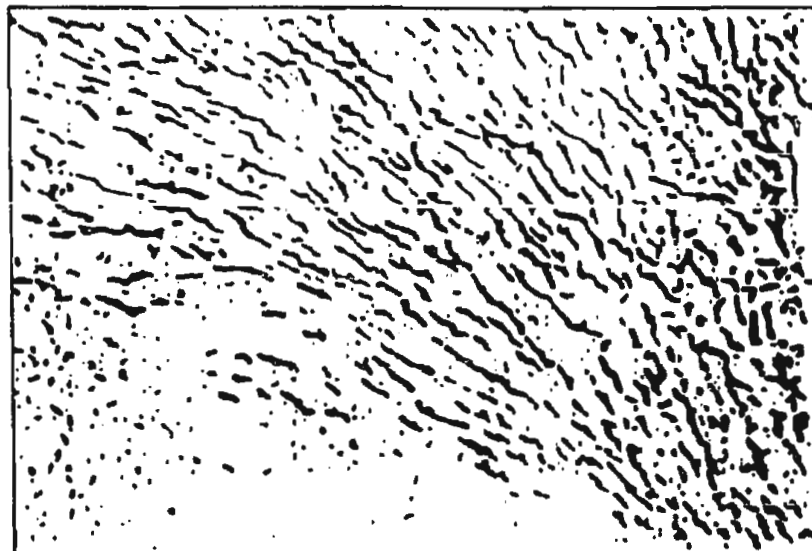
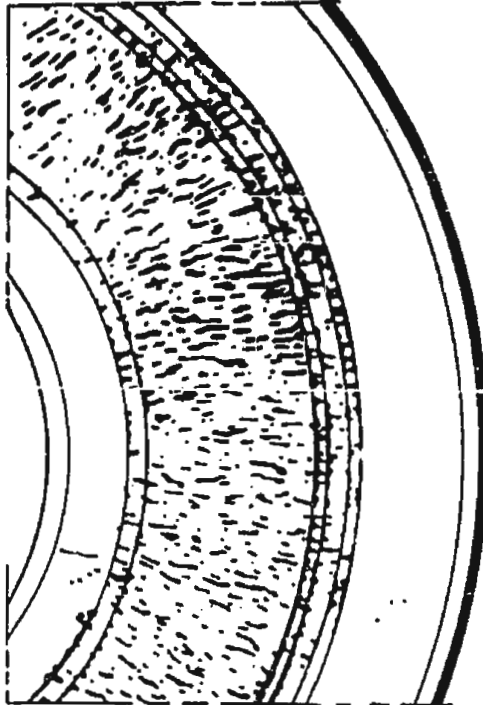
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32-41-01
Page 632
Dec 15/92

LOCKHEED
MAINTENANCE MANUAL



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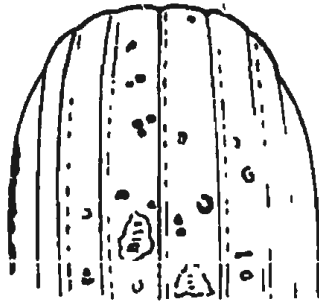
Ozone and/or Weather Checking
Figure 621

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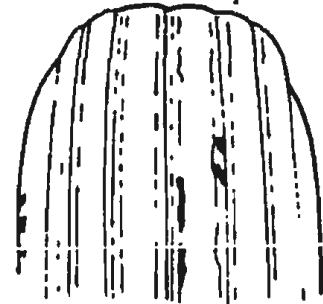
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32-41-01
Page 633
Dec 15/92

LOCKHEED
MAINTENANCE MANUAL

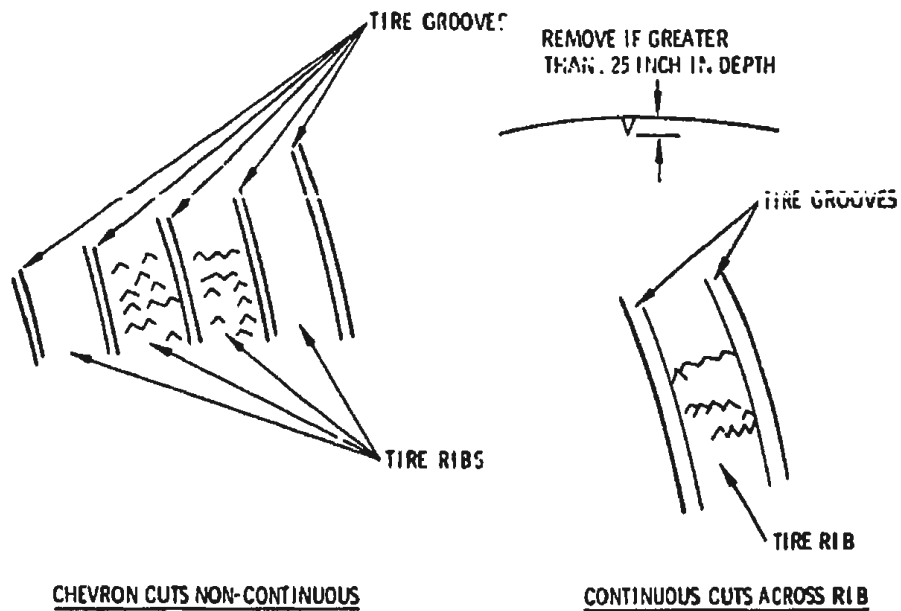


VIEW A



VIEW B

TREAD FLAKING, CHIPPING AND CHUNKING
FIGURE 622



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Chevron Tearing
Figure 623

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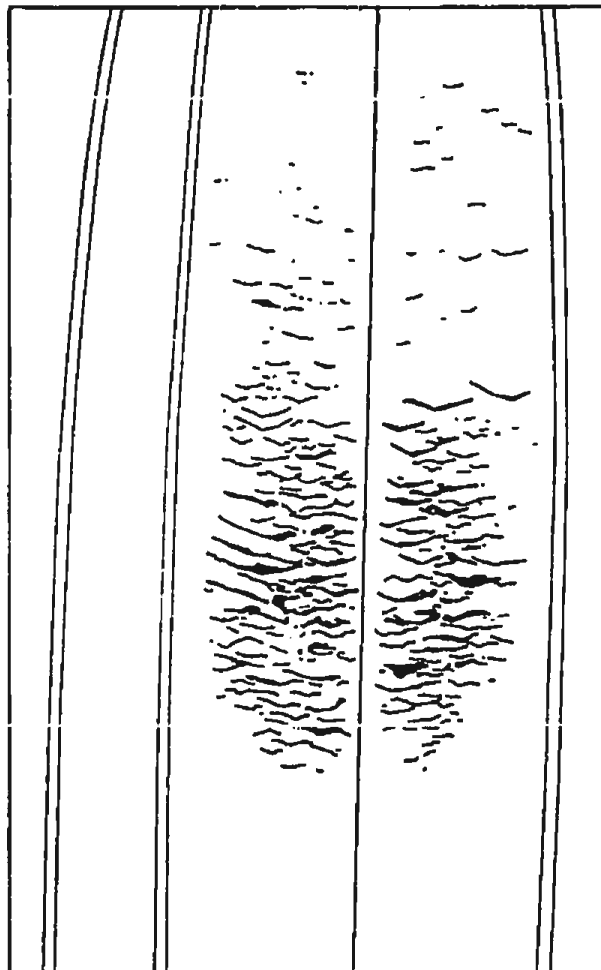
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32-41-01
Page 634
Dec 15/92

LOCKHEED



MAINTENANCE MANUAL



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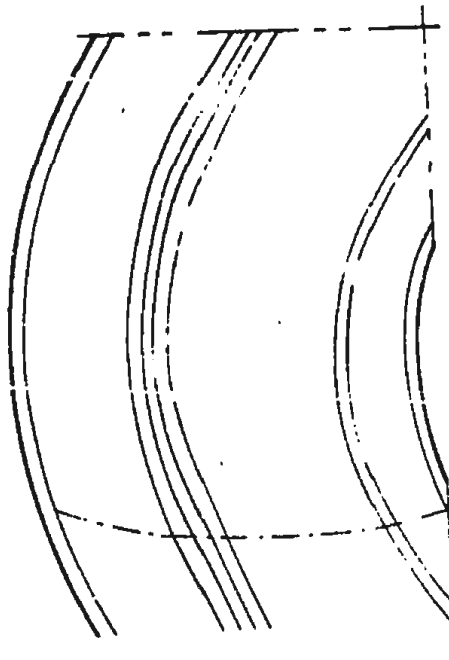
Non-Detrimental Chevron Tearing
Figure 624

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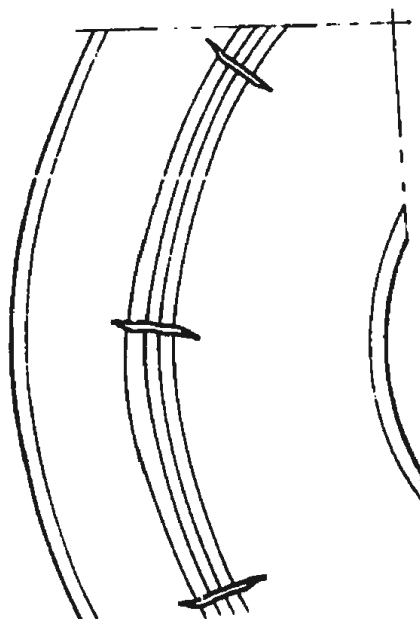
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32-41-01
Page 635
Dec 15/92

LOCKHEED
MAINTENANCE MANUAL



CIRCUMFERENTIAL CRACKS
FIGURE 625



Radial Cracks
Figure 626

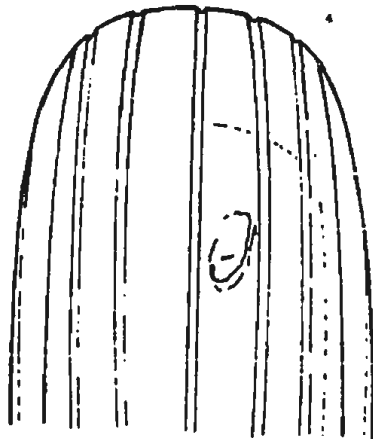
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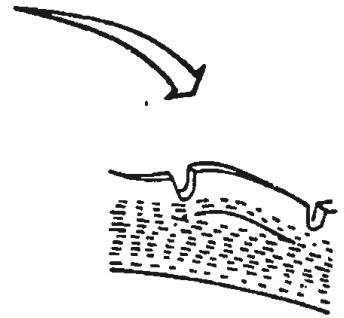
32-41-01
Page 636
Dec 15/92



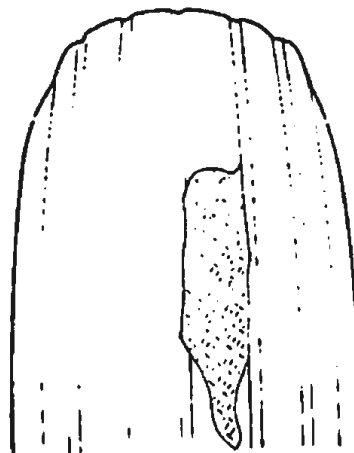
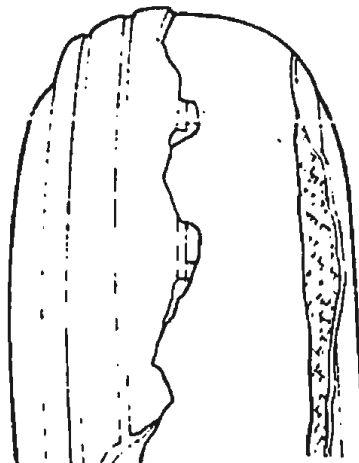
VIEW A



VIEW B



TREAD SEPARATION - BLISTER OR BULGE
FIGURE 627



Thrown Tread - Peeled Rib
Figure 628

M1-0001-32-755

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32-41-01
Page 637
Dec 15/92

LOCKHEED
MAINTENANCE MANUAL

TIRE/ WHEEL CHANGE RECORD		WHEEL POSITION: ("Y" Applicable Wheel)	
PLANE NO 4356	DATE 8/13/85	DC-9-80227/671707/L1011	747 ONLY
STATION MC-1	FLY NO 538	NOSE ☐ L ☐ R ☐ GEAR	NOSE ☐ L ☐ R ☐ GEAR
MAINT OP CK-2		MAIN ☐ L ☐ R ☐ GEAR	WING ☐ L ☐ R ☐ GEAR
		FRONT ☐ L ☐ R ☐ GEAR	FRONT ☐ L ☐ R ☐ GEAR
		REAR ☐ L ☐ R ☐ GEAR	REAR ☐ L ☐ R ☐ GEAR
		BODY ☐ L ☐ R ☐ GEAR	BODY ☐ L ☐ R ☐ GEAR
		FRONT ☐ L ☐ R ☐ GEAR	FRONT ☐ L ☐ R ☐ GEAR
		REAR ☐ L ☐ R ☐ GEAR	REAR ☐ L ☐ R ☐ GEAR
ADN) OR CIRCLE INFO BELOW			
INSTALLED TIRE/WHEEL		REMOVED TIRE	
TIRE SERIAL NUMBER 5112A00378	TIRE SERIAL NUMBER		
1B WHEEL HALF SN 1222	1B WHEEL HALF SN		
O B WHEEL HALF SN 3078	O B WHEEL HALF SN		
MFG.	TREAD	MFG.	TREAD
BRIDGESTONE ☐ BF GOODRICH GOODYEAR OTHER	0 ORIGINAL RECAP NO 1 5 9 2 6 10 3 7 11 4 8 12	BRIDGESTONE DUNLOP FIRESTONE BF GOODRICH GOODYEAR MILBIL OTHER	0 ORIGINAL RECAP NO 1 7 2 8 3 9 4 10 5 11 6 12
RECAPPER	RECAPPER	RECAPPER	RECAPPER
AIR TREADS BF GOODRICH GOODYEAR THOMPSON OTHER	AIR TREADS BF GOODRICH GOODYEAR THOMPSON OTHER	AIR TREADS BF GOODRICH GOODYEAR THOMPSON OTHER	AIR TREADS BF GOODRICH GOODYEAR THOMPSON OTHER
FILL IN MISSING INFO		MECHANIC REG. NO.	
		19756	
FORM M 237 11 82		FORWARD TO MCI IMMEDIATELY	

M1-0000-32-3026

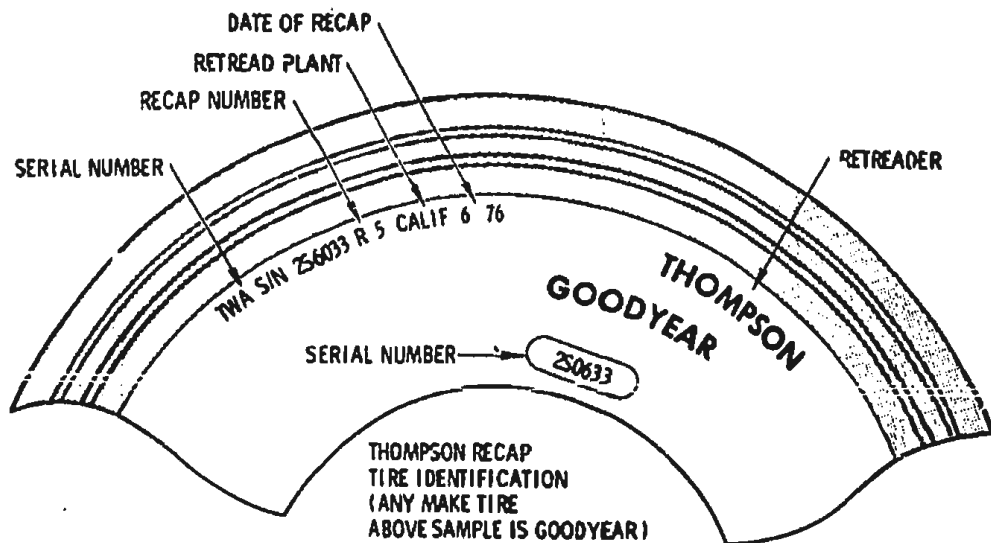
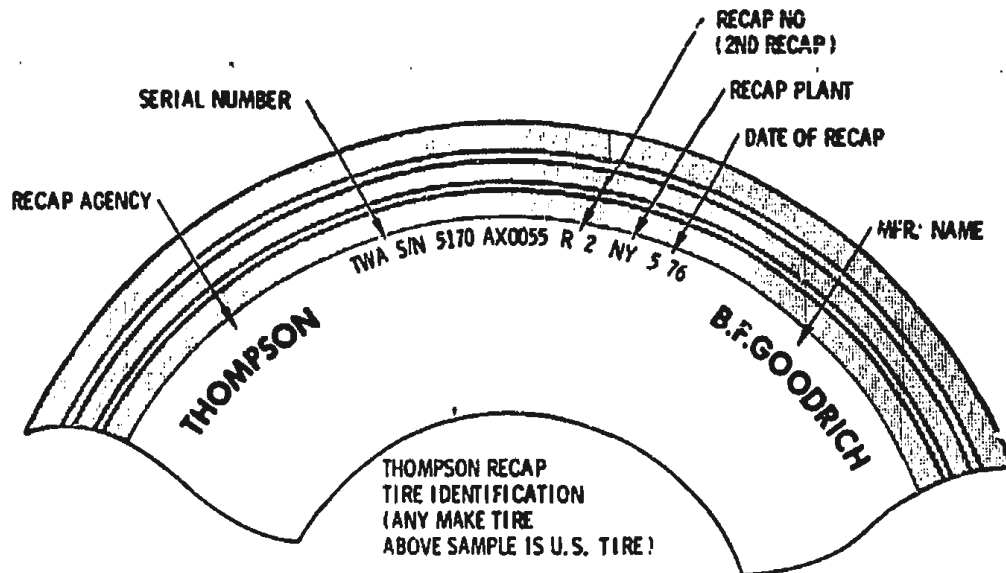
Example of Completed M-237
Figure 629

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EFFECTIVITY: ALL

32-41-01
Page 638
Dec 15/92

LOCKHEED
MAINTENANCE MANUAL



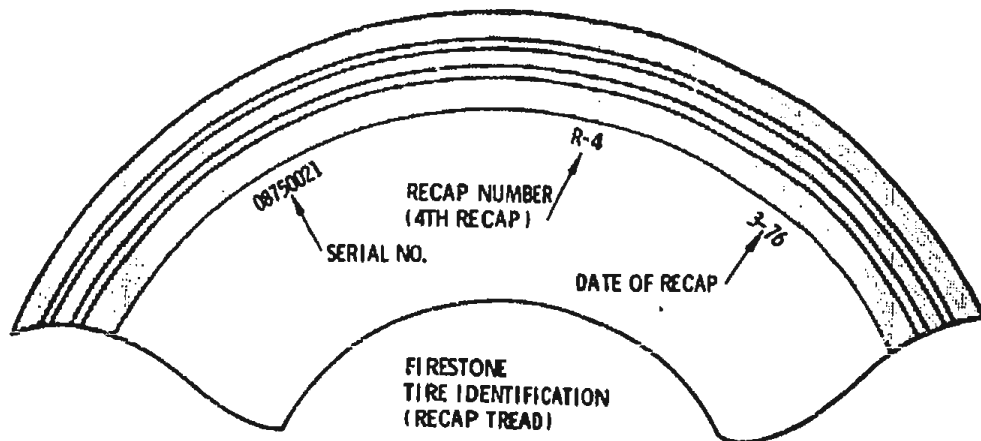
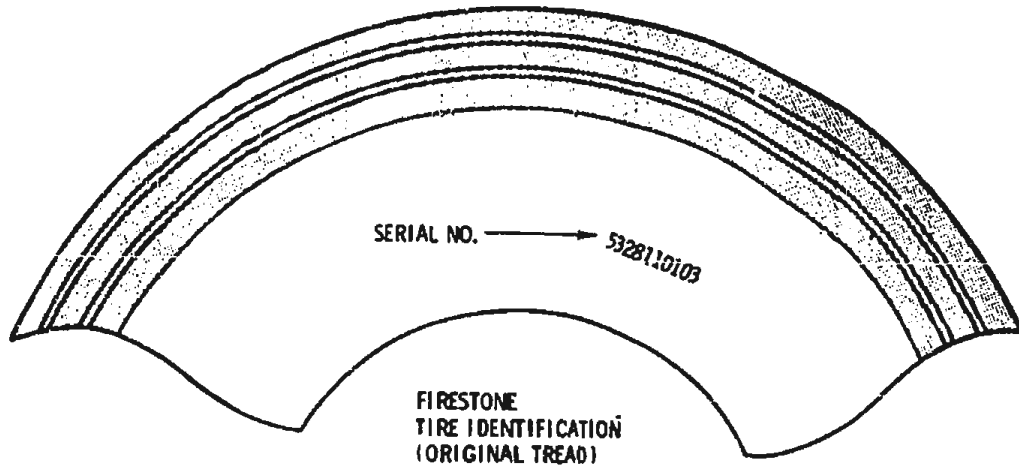
M1-0000-32-758

Tire Identification
Figure 630 (Sheet 1)

32-41-01
Page 639
Dec 15/92

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EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL



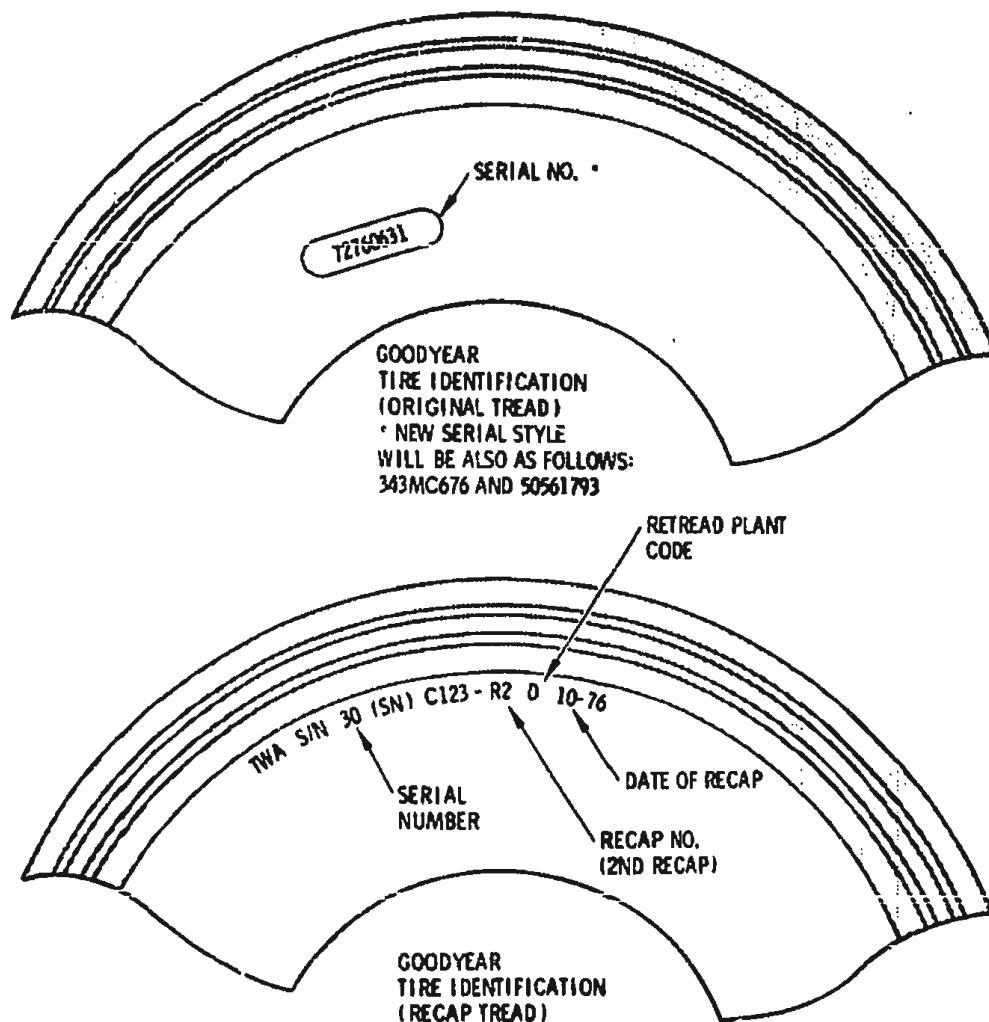
M1-0000-32-759

Tire Identification
Figure 630 (Sheet 2)

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EFFECTIVITY: ALL

32-41-01
Page 640
Dec 15/92



M1-0000-32-760

Tire Identification
Figure 630 (Sheet 3)

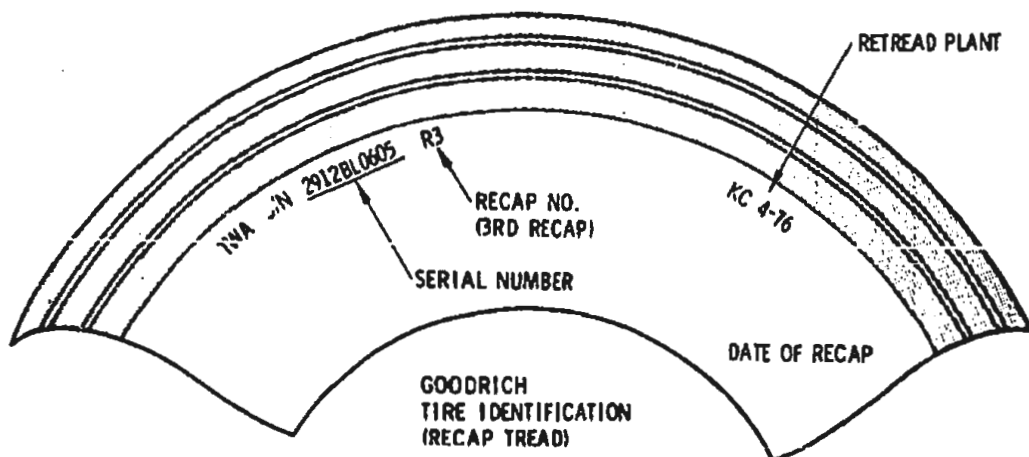
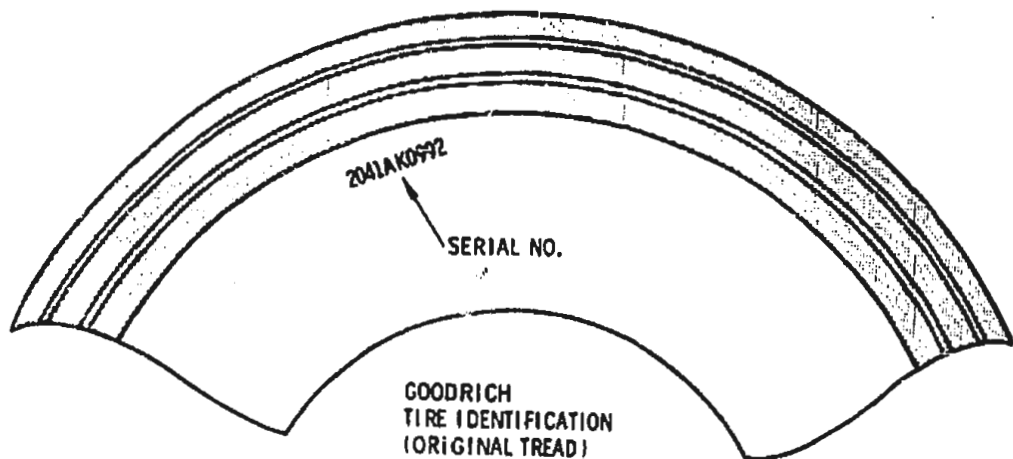
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EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL



MI-0000-32-761

Tire Identification
Figure 630 (Sheet 4)

32-41-01
Page 642
Dec 15/92

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EFFECTIVITY: ALL

NOSE LANDING GEAR WHEELS AND TIRES - DESCRIPTION AND OPERATION1. General

The nose landing gear (NLG) is equipped with two identical wheel and tire assemblies. The wheels and tires are designed to withstand speeds up to 225 miles per hour.

2. Nose Landing Gear Wheels

A. Description

The NLG wheels, zone 711, are forged aluminum split assemblies designed for tubeless tires (Ref. Fig. 1). The wheel halves are held together with bolts.

A seal is installed in an annular groove in the inboard wheel half between the wheel bolts and the rim to prevent air leakage. A tire inflation valve is provided in the outer wheel half. Opposite the inflation valve is an over inflation, frangible disc, pressure relief device that relieves at 325 to 375 psi.

Tapered roller bearings at the ends of the wheel hub carry the wheel load to the axle. The bearing cone and rollers seat in replaceable bearing caps which are pressed into the bearing bore. Inboard and outboard seals retain grease in the bearing areas and prevent entry of dirt and moisture.

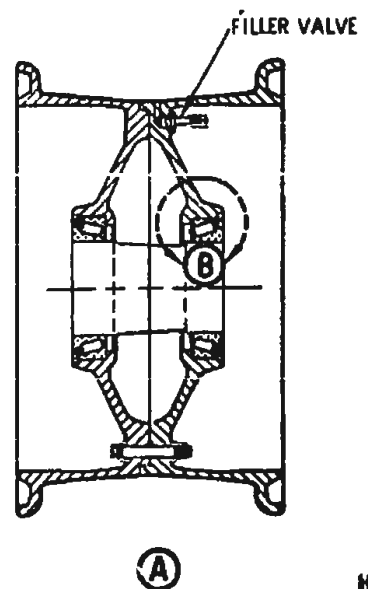
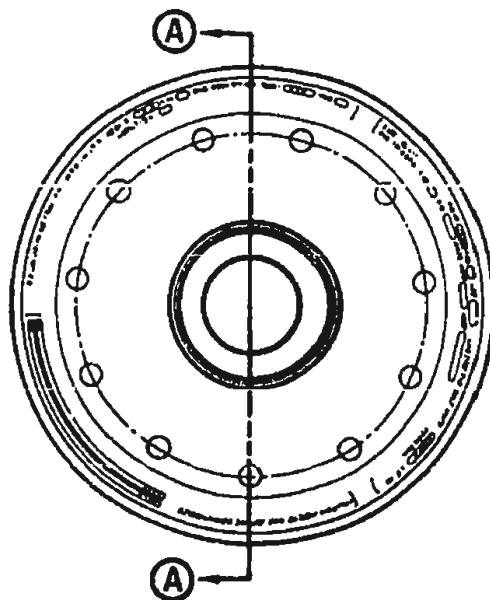
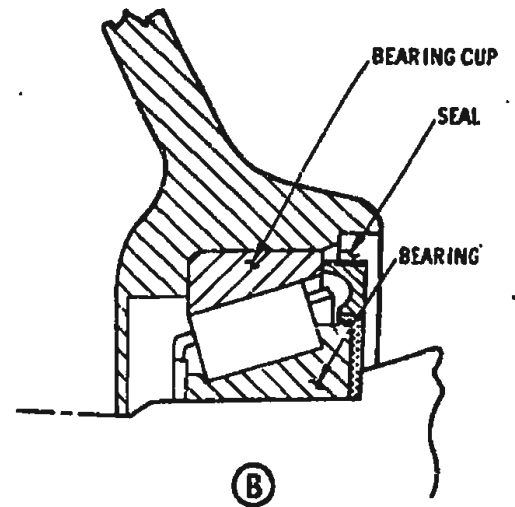
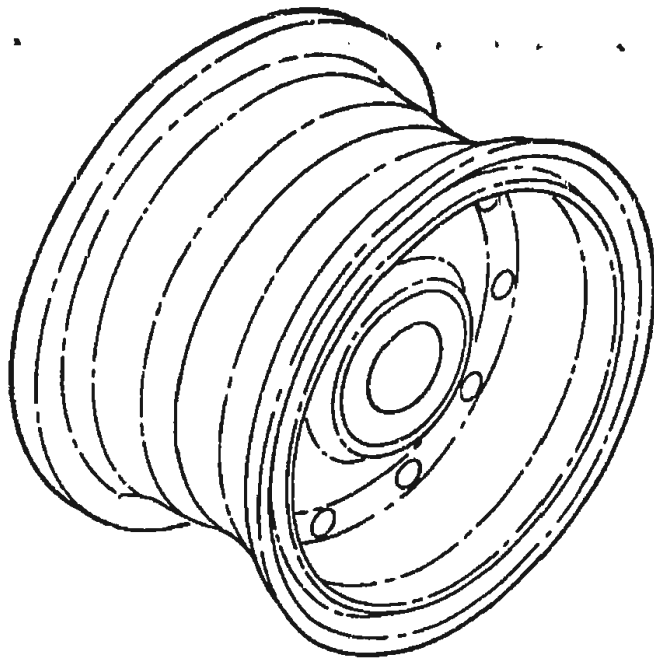
3. Nose Landing Gear Tires

A. Description

On aircraft 015-024, 027 without SB32-080 and 001-014, the NLG wheel mounts tubeless, reinforced tread, 20 ply rated, or 22 ply rated, 36 x 11 type VII, 225 MPH tires. Reference Chapter/Section 12-14-01 for tire inflation pressure.

NOTE: NLG tire size for airplanes 019, 020, 023, 024, 025, 026, 027, 028, (-50 and -100) thru 999 is 37 x 13 -16/20 ply rated. No intermixing of 36 x 11 and 37 x 13 is allowed.

LOCKHEED
MAINTENANCE MANUAL



M1 5209
M1-A00-32-080

Nose Landing Gear Wheel
Figure 1

EFFECTIVITY: ALL

050B

32-42-00
Page 2
Dec 1/71

LOCKHEED
MAINTENANCE MANUAL

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NOSE LANDING GEAR WHEEL AND TIRE ASSEMBLY
REMOVAL AND INSTALLATION

1. Equipment and Materials

Axle Jack

Cotter Pin, MS24665-153, or equivalent

Low Adhesion Sealing Compound, LAC Spec C-40-769, Type II, or equivalent

Grease, Aeroshell 5, or equivalent

NLG Axle Protector, PN BA40

NLG Torque Wrench Adapter, PN BA28

Torque Wrench

Wheel/Tire and Brake Change Dolly, PN STC11471-1, Spec Tool Co., or equivalent

2. Referenced Procedures

7-12-00 Axle Jacking - Maintenance Practices

12-14-01 Tire Inflation

20-51-04 Environmental Sealing of Model L-1011 Airplane
(PB75-425)

3. Removal/Installation

A. Removal

- (1) Position axle jack and raise wheel and tire assembly until clear of ground (Ref. 7-12-00).

NOTE: If wheel is being removed because of tire tread failure or low pressure, check tire pressure before deflating and record on Serviceable/Unserviceable tag.

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- (2) Deflate tire, unless wheel and tire are to be reinstalled.

- (3) Remove axle nut locking bolt.

EFFECTIVITY: ALL

001B

32-42-01
Page 401
Nov 15/84

LOCKHEED
MAINTENANCE MANUAL

- (4) Loosen axle nut, with NLG torque wrench adapter and 3/4-inch drive wrench.
- (5) Ensure that there is no side load on wheel. Remove axle nut and outer spacer.
- (6) Position wheel/tire and brake change dolly so that tire is resting on dolly rollers (Ref. Fig. 401). Install chain.
- (7) Check for side load on wheel and remove outer seal and bearing.
- (8) Remove wheel and tire assembly ensuring that side loads on wheel are maintained at a minimum.
- (9) Remove inner bearing and seal.
- (10) Inspect axle for crack, corrosion, and impact damage.
- (11) Inspect wheel for evidence of cracks and impact damage.
- (12) Inspect bearings for wear and damage.
- (13) If replacement wheel and tire are not installed immediately, install NLG axle protector.

CAUTION: ANY MIXTURE OR COMBINATION OF DIFFERENT NLG WHEEL AND TIRE ASSEMBLIES AND MLG WHEEL AND TIRE ASSEMBLIES OTHER THAN THE COMBINATIONS LISTED BELOW IS NOT APPROVED FOR INSTALLATION ON THE SAME AIRCRAFT.

C	L1011-1 DOMESTIC	
C	-----	
C	MAIN GEAR TIRE	NOSE GEAR TIRE
C	-----	
CR	50 x 20 -20/34PR	37 x 13 -16/20PR
CR		37 x 13 -16/26PR
C	-----	
C	<u>NOTE:</u> NO INTERMIXING OF TIRES BETWEEN FLEETS	
C	L1011-50, -100 INTERNATIONAL	
C	-----	
C	MAIN GEAR TIRE	NOSE GEAR TIRE
C	-----	
C	52 x 20.5 -20/36PR	37 x 13 -16/20PR
C		37 x 13 -16/26PR

EFFECTIVITY: ALL

32-42-01
Page 402
May 15/88

001B

LOCKHEED
MAINTENANCE MANUAL

B. Installation

(1) Remove NLG axle protector, if installed.

(2) Install new inner seal.

C (3) Ensure that inner bearing is packed with RONEX MP grease, or equivalent, and install bearing.

CAUTION: ENSURE THAT THE APPLICABLE WHEEL AND TIRE ASSEMBLY IS INSTALLED. FAILURE TO DO SO COULD RESULT IN ASSEMBLY DAMAGE.

(4) Position replacement wheel and tire assembly on wheel/tire and brake change dolly and install chain.

(5) Adjust dolly to align wheel with axle.

CR **CAUTION:** ASSURE INBOARD GREASE SEAL IS INSTALLED INSIDE THE
CR HUB FLUSH WITH THE FACE. IT IS NOT ACCEPTABLE TO
CR ALLOW A PARTIAL SECTION OF SEAL FLANGE TO BE
CR EXPOSED AND RIDING ON THE NOSE WHEEL HUB.

(6) Install wheel and tire assembly on axle ensuring that bearing cup mates with bearing.

C (7) Ensure that outer bearing is packed with RONEX MP grease, or equivalent, and install bearing and seal.

C (8) Lubricate axle nut threads with Aeroshell 7; optional
C Parker 0-lube and install axle nut hand tight.

(9) Remove installation dolly.

(10) Torque axle nut as follows.

While rotating wheel:

C (a) Torque axle nut to 200 lb-ft.

(b) Back nut off to zero torque.

C (c) In one continuous motion torque nut to 200 lb-ft.

C (d) Tighten nut to first lock position and install
C locking bolts.

C **NOTE:** Ensure locking bolts are NOT installed in
C one of the axle nut wrench slots.

C Ensure locking bolts are installed with
C heads up or to the outside of spacer.

EFFECTIVITY: ALL

001B

32-42-01
Page 403
Dec 15/91

LOCKHEED



MAINTENANCE MANUAL

- C
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Ensure nuts have adequate self locking torque.

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(e) Secure locking bolts with washer and nut.

(11) Inflate tire to recommended pressure (Ref. 12-14-01).

(12) Remove jack (Ref. 7-12-00).

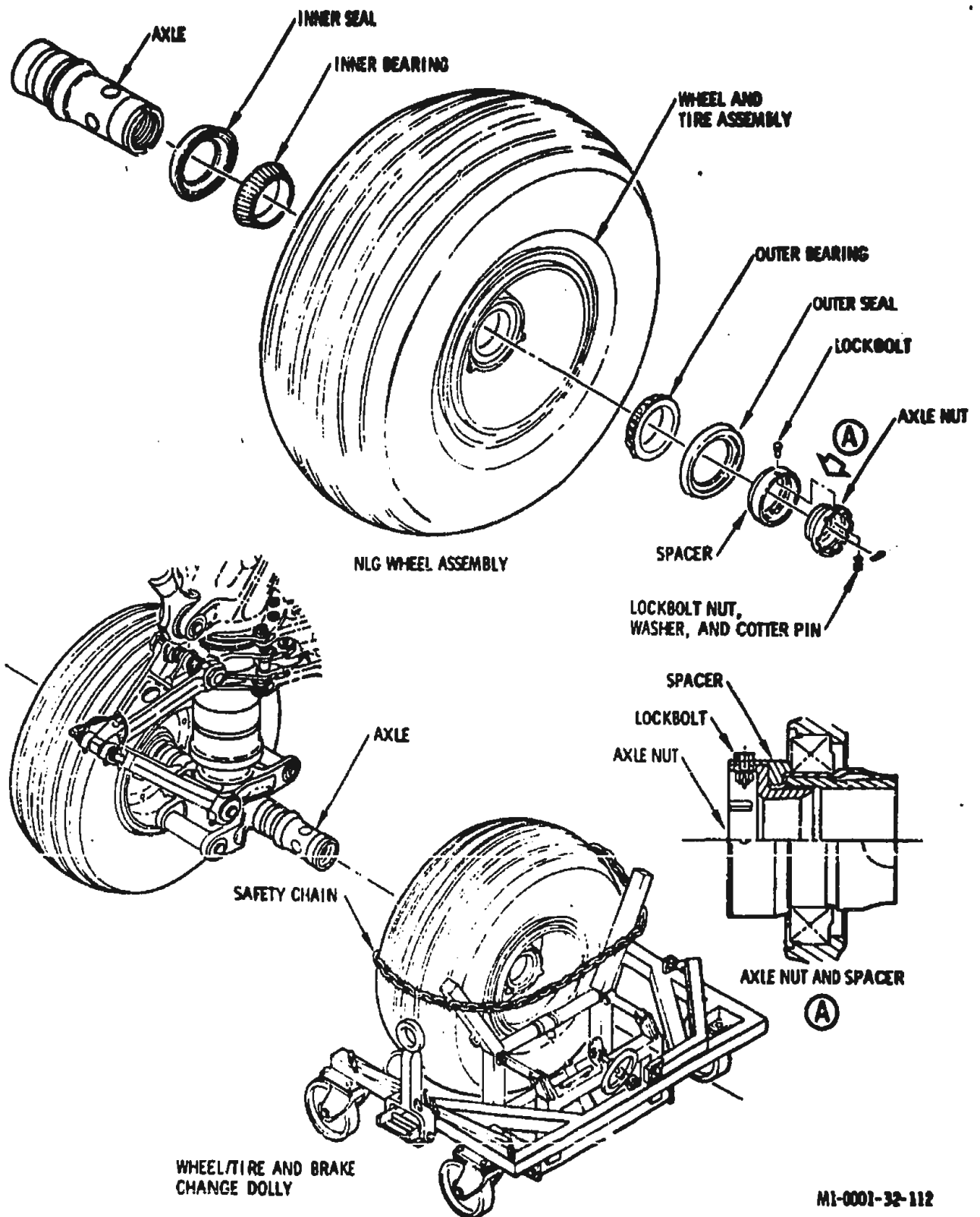
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32-42-01
Page 404
Dec 15/91

LOCKHEED
MAINTENANCE MANUAL



Nose Landing Gear Wheel and Tire - Removal and Installation
Figure 401

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001B

EFFECTIVITY: ALL

32-42-01
Page 405/406
Nov 15/86

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR BRAKE SYSTEM - DESCRIPTION AND OPERATION

1. **General**

The main landing gear (MLG) brake system controls brake action during landing and ground operations and stops MLG wheel rotation during gear retraction. Brakes are hydraulically actuated through mechanical linkage and cables from the flight station brake pedals.

Except for the linkage and cable brake control mechanism, the system consists of the following components:

Accumulators

Brake supply module assemblies

Dual brake power valves

Brake control modules

Brake solenoid shutoff valves

Pressure actuated hydraulic valves (spindown valves)

Shuttle valves

Brake return line check valves

Brake assemblies

Brake input mechanism

Electrical indicating and control circuitry shown (Ref. Fig. 1)

Brake system plumbing (Fig. 2, 3, and 4)

- R There are two complete brake systems (Ref. Fig. 5). The two systems (normal and alternate) have differences (Ref. Fig. 6) in the following components: accumulators, brake supply module assemblies, and the spindown valve. The parking brake control is on the Captains side. Hydraulic system B powers the normal system and hydraulic system C powers the alternate system. Electrical system power comes from 28V dc bus No. 3.

EFFECTIVITY: ALL

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32-43-00
Page 1
May 15/82

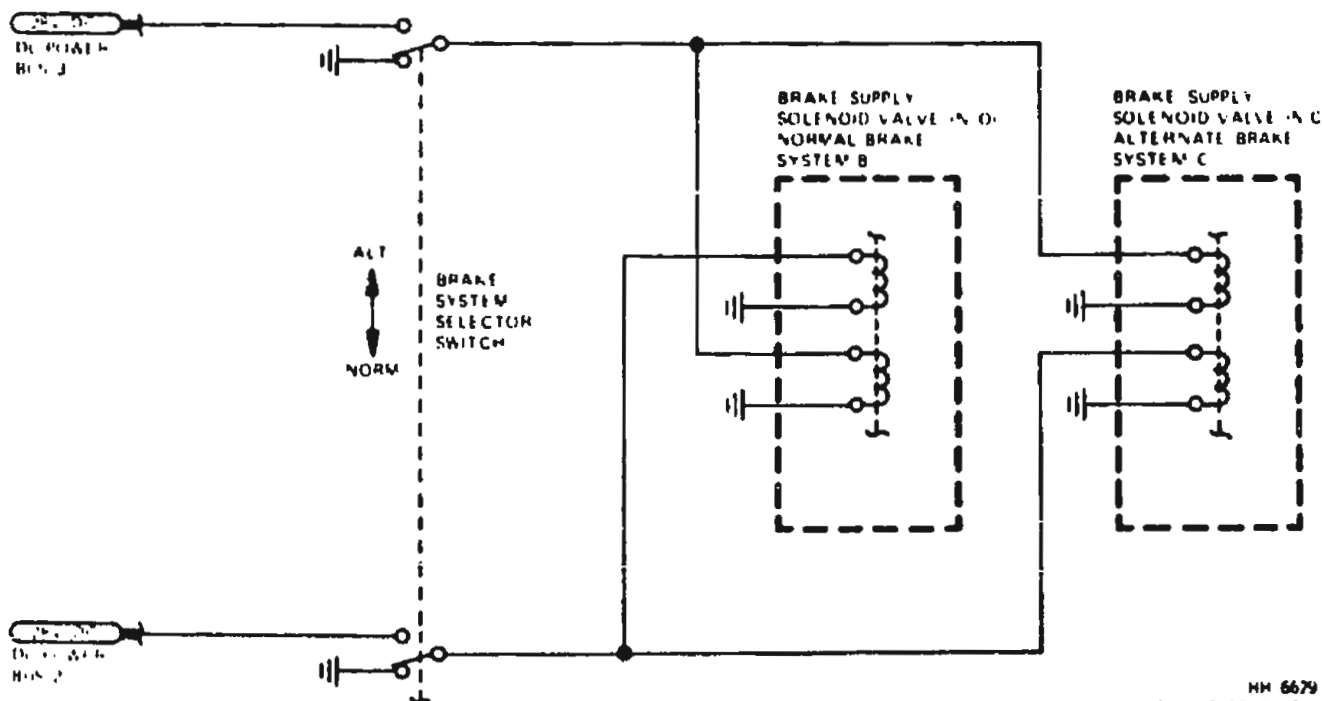
LOCKHEED
MAINTENANCE MANUAL

2. Operation

- During normal brake operation, the BRAKE SYS SELECT switch on the pilots center instrument panel, zone 212, is placed in the NORM SYS B position. The normal and alternate brake supply module assemblies, zone 147, are deenergized, which causes hydraulic system B to be selected. The two brake solenoid shutoff valves, zone 147, are electrically energized open. Application of brake pedal pressure through the brake input mechanism, the linkage, and cable brake control mechanism positions the dual brake valves, zone 147, and meters hydraulic flow through the brake control modules, zones 542 and 642, and shuttle valves to the brake assemblies.
- Alternate brake operation is the same as normal, except that the BRAKE SYS SELECT switch is placed in the ALT SYS C position. Both alternate and normal brake supply module assemblies are energized, which causes hydraulic system C to be selected.

On aircraft 001-014, during parking brake operation, cams and pawls in the brake input mechanism, zone 110, lock brake pedal pressure on, which opens the dual power brake valves.

A mechanically actuated parking brake switch, zone 110, is opened. The opened switch deenergizes the brake solenoid



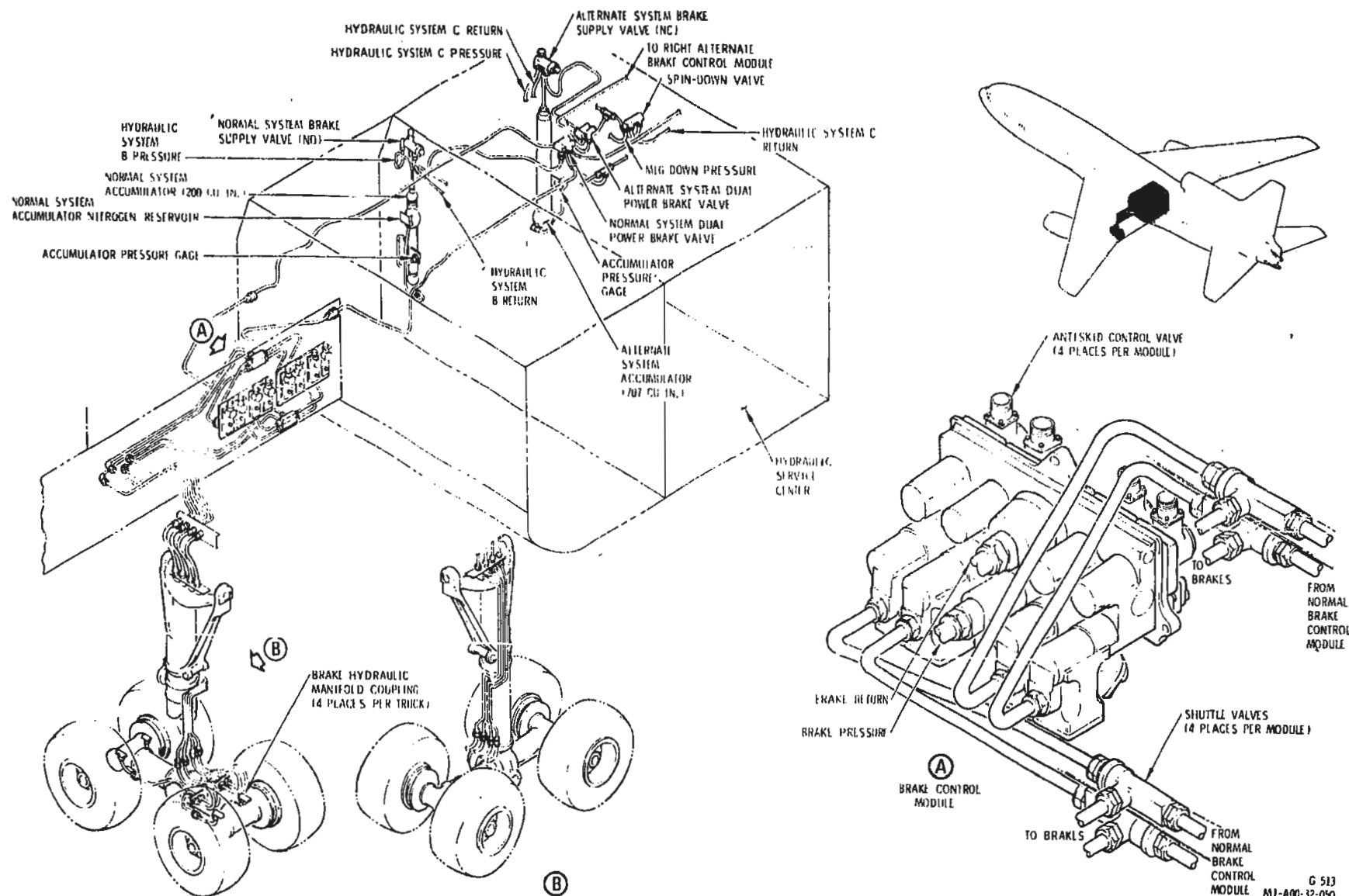
HM 6679
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Brake System Electrical Schematic Diagram
Figure 1

EFFECTIVITY: ALL

001B

32-43-00
Page 2
May 15/82

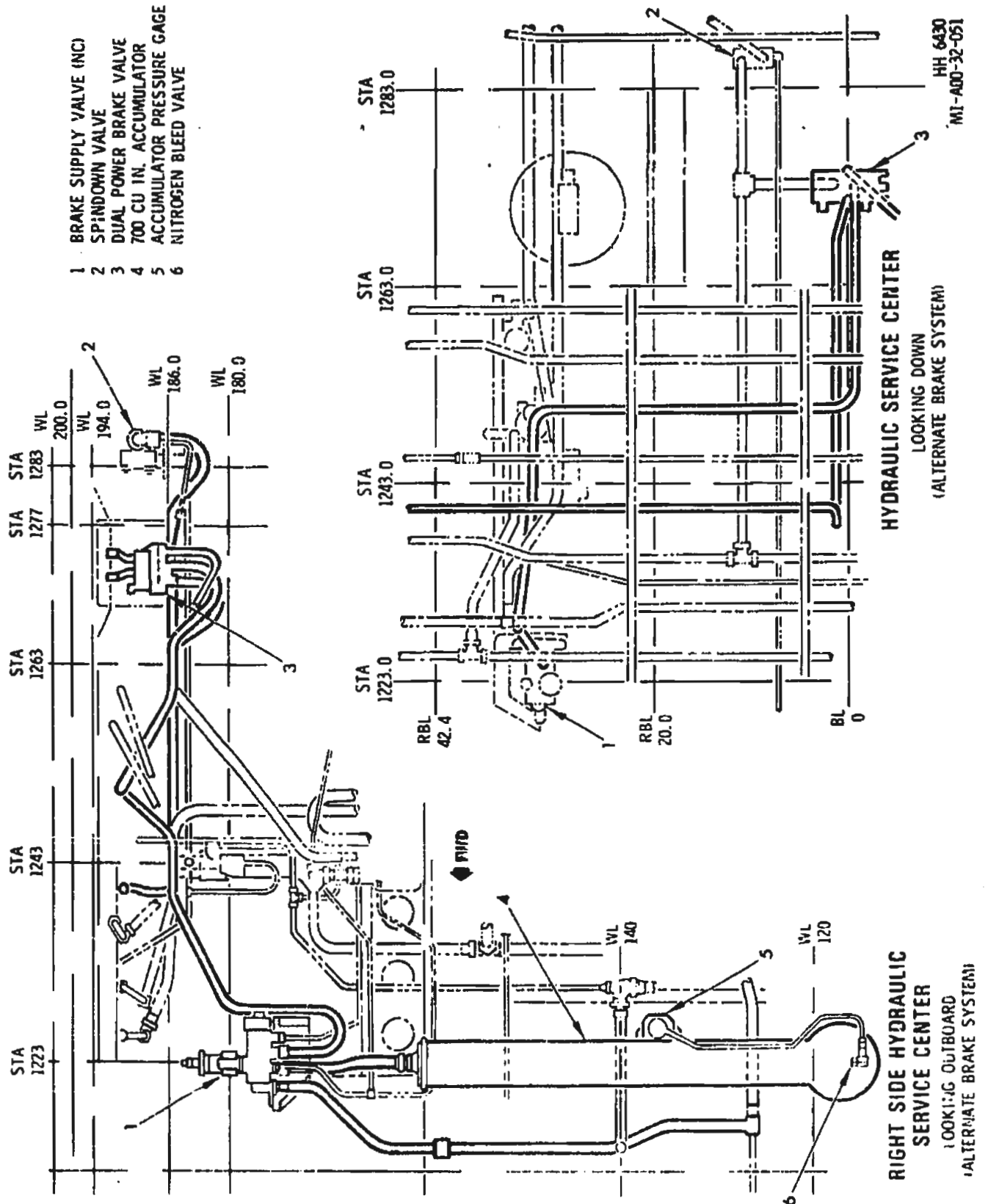


Brake System Hydraulic Component Location
Figure 2 (Sheet 1)

EFFECTIVITY: ALL

32-43-00
Page 3/4
Dec 1/71

LOCKHEED
MAINTENANCE MANUAL



Brake System Hydraulic Component Location
Figure 2 (Sheet 2)

EFFECTIVITY: ALL

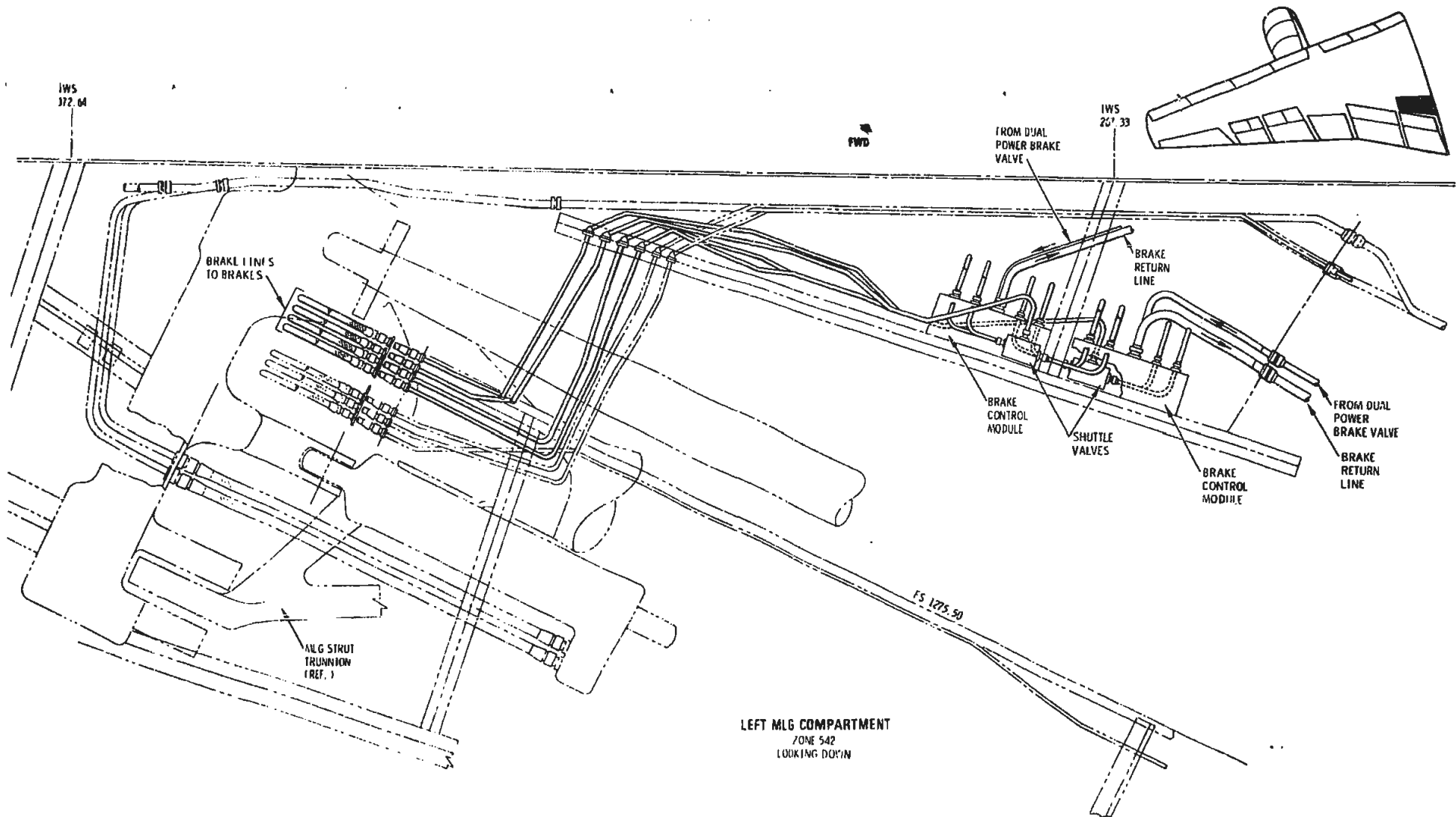
32-43-00
 Page 5
 Dec 1/71



Brake System Hydraulic Component Location
Figure 2 (Sheet 3)

EFFECTIVITY: ALL

32-43-00
Page 6
Dec 1/71



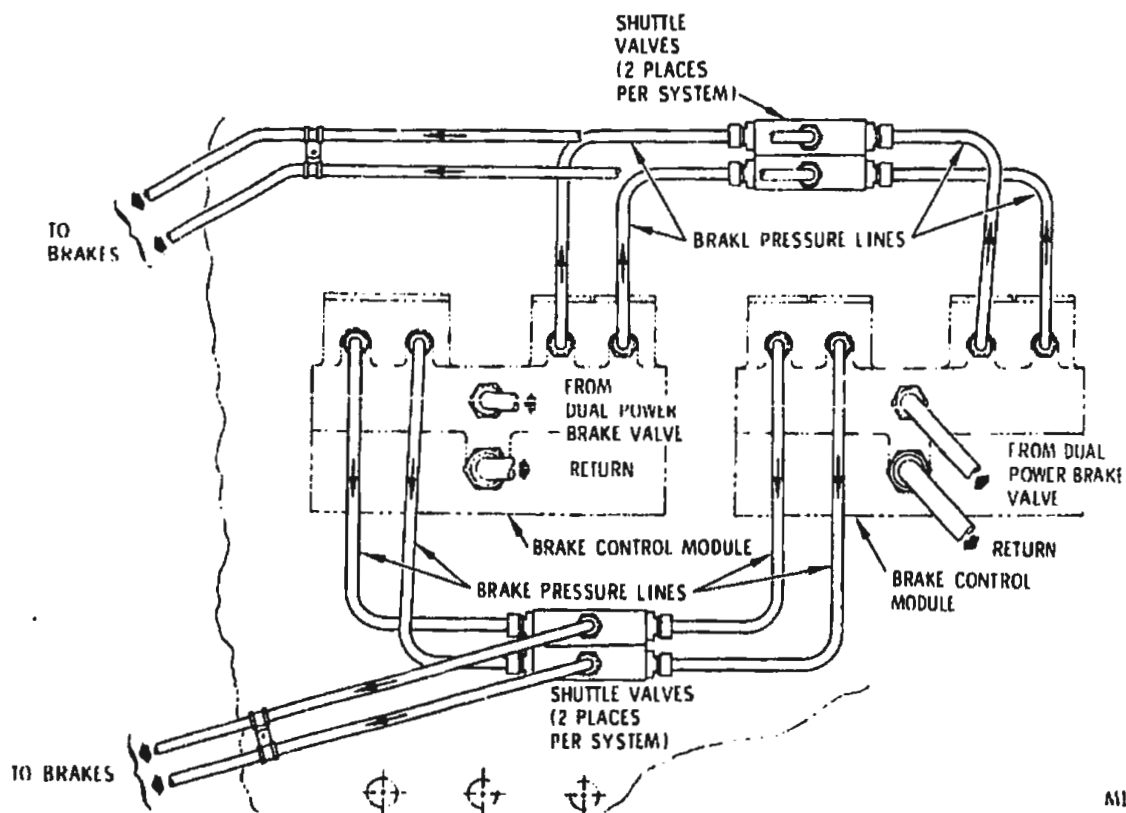
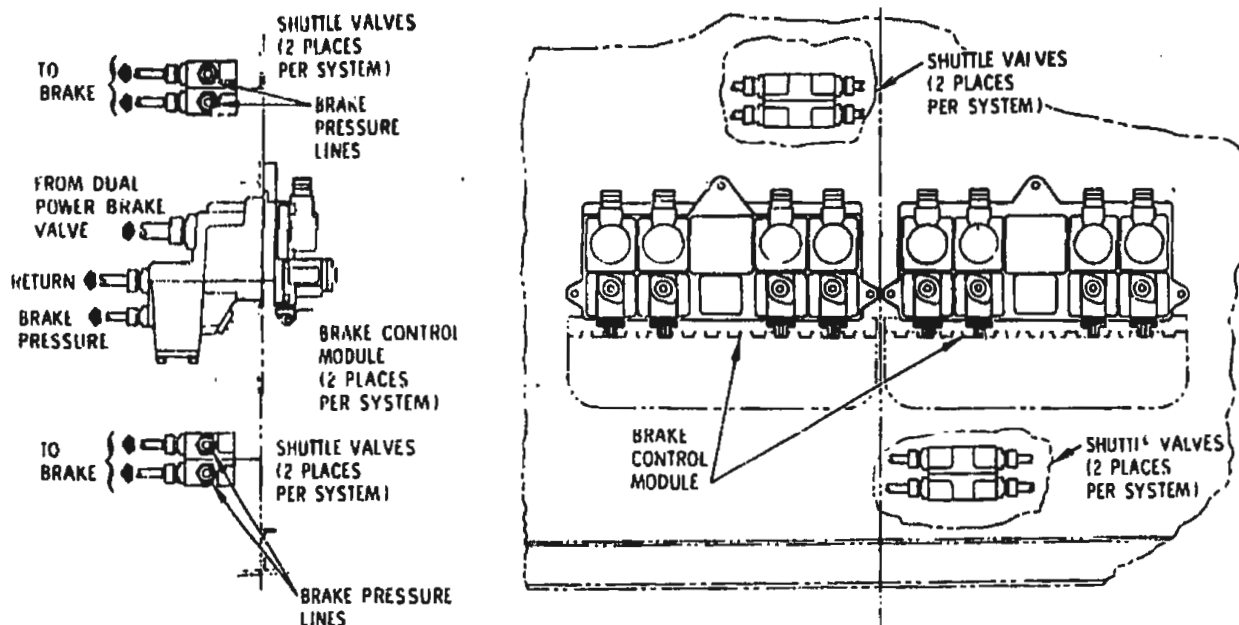
Brake System Wing Plumbing
Figure 3 (Sheet 1)

EFFECTIVITY: ALL

32-43-00
Page 7/8
Dec 1/71

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LOCKHEED
MAINTENANCE MANUAL



**Brake System Wing Plumbing
Figure 3 (Sheet 2)**

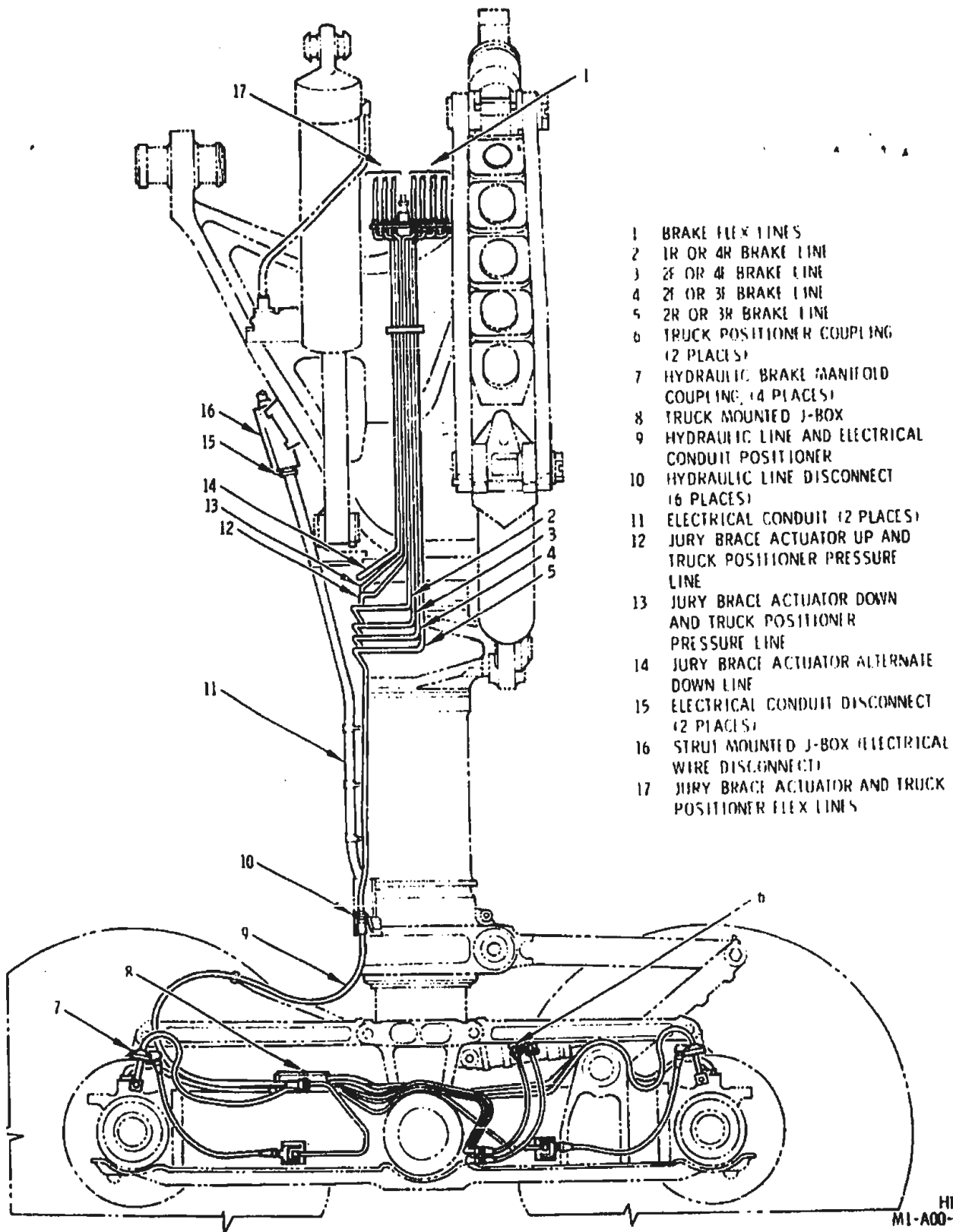
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EFFECTIVITY: ALL

32-43-00

Page 9
Dec 1/71

LOCKHEED
MAINTENANCE MANUAL



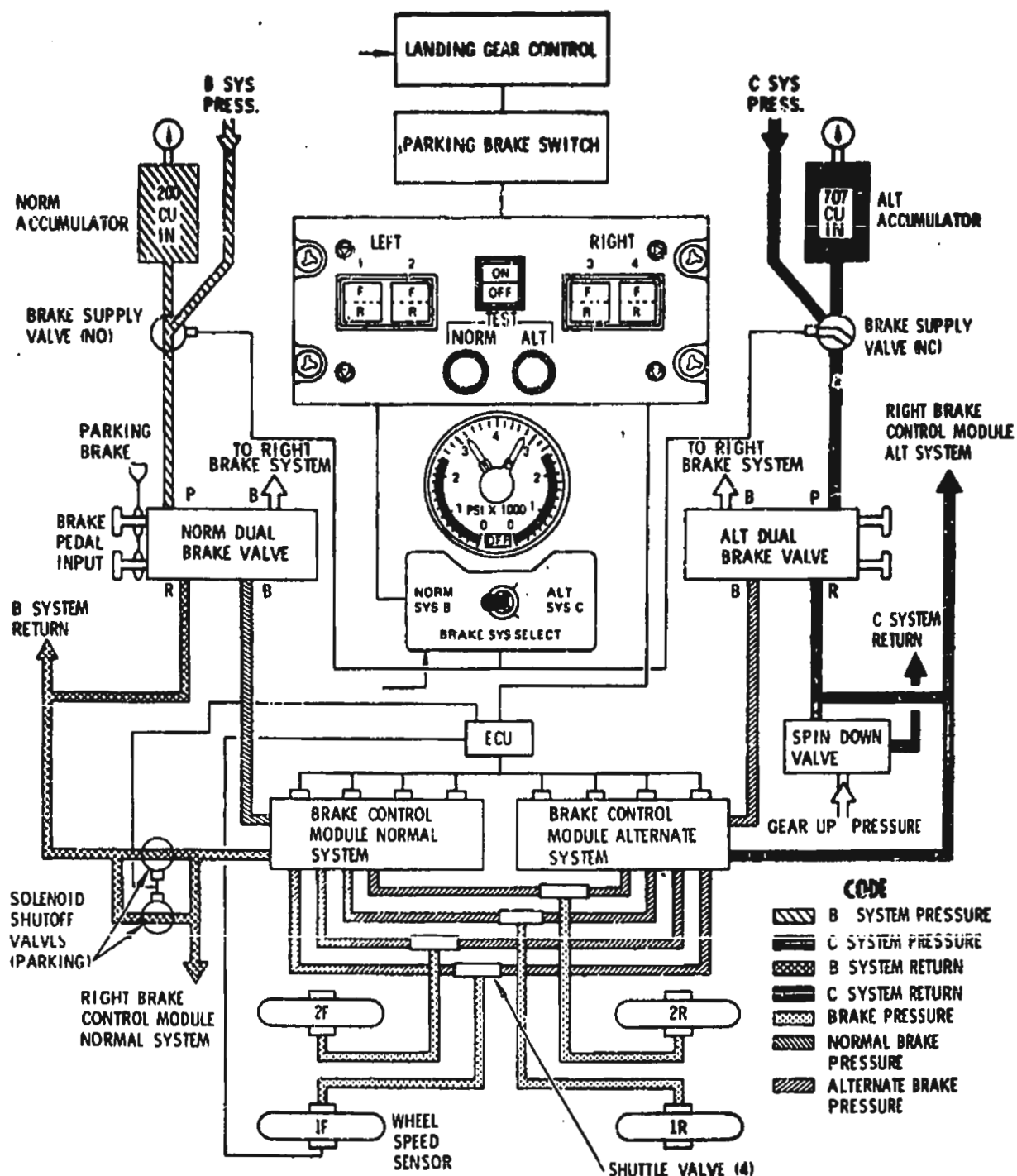
Brake System Main Landing Gear Plumbing
Figure 4

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EFFECTIVITY: ALL

32-43-00
Page 10
Dec 1/72

LOCKHEED
MAINTENANCE MANUAL



MI-0000-32-3029

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Brake System Diagram
Figure 5

EFFECTIVITY: ALL

001B

32-43-00
Page 11
May 15/85



shutoff valves, causing them to close electrically. Hydraulic pressure retained by the accumulator, zone 147, is applied to the brake assemblies, and since return flow is blocked by the brake solenoid shutoff valves, the brakes are held on.

On aircraft 015-999, during parking brake operation, rotating stops and linkage in the hydraulic service center, zone 147, lock brake pedal pressure on, which opens the dual power brake valves.

A mechanically actuated parking brake switch, zone 147, deenergizes the brake solenoid valves, which cause them to close. Hydraulic pressure retained by the accumulator, zone 147, is applied to the brake assemblies, and since return flow is blocked by the brake solenoid shutoff valves, the brakes are held on.

Selection of gear-up operation after takeoff, applies hydraulic pressure to the spindown valve, zone 147. The actuated spindown valve applies hydraulic pressure through the deenergized dual brake valves, the brake control module, and the shuttle valves to the brake assemblies. The brakes are applied and the wheels stop rotating.

3. Brake Supply Module Assemblies

A. Description

An individual brake supply module, zone 147 is installed in each of the brake hydraulic systems (Ref. Fig. 7). The normal brake system contains a normally open module valve, and the alternate system contains a normally closed module valve. Two solenoids controlled by the BRAKE SYS SELECT switch on the pilots center instrument panel, zone 210, actuate control valves and provide a means for module valve actuation. Failure of one solenoid does not impair the module valve function. Indicators (one for each solenoid operated control valve) show when the brake supply module assembly is being actuated. An inlet check valve prevents bleeding of brake pressure when hydraulic system pressure is reduced. A pressure transmitter provides a signal for brake pressure indication on the pilots center instrument panel. A pressure switch provides a source for low brake pressure indication on the Flight Engineer/Second Officers upper (HYDRAULIC SYSTEM) panel. Brake pressure is also indicated on the HYDRAULIC SYSTEM SERVICING PANEL, ZONE 147.

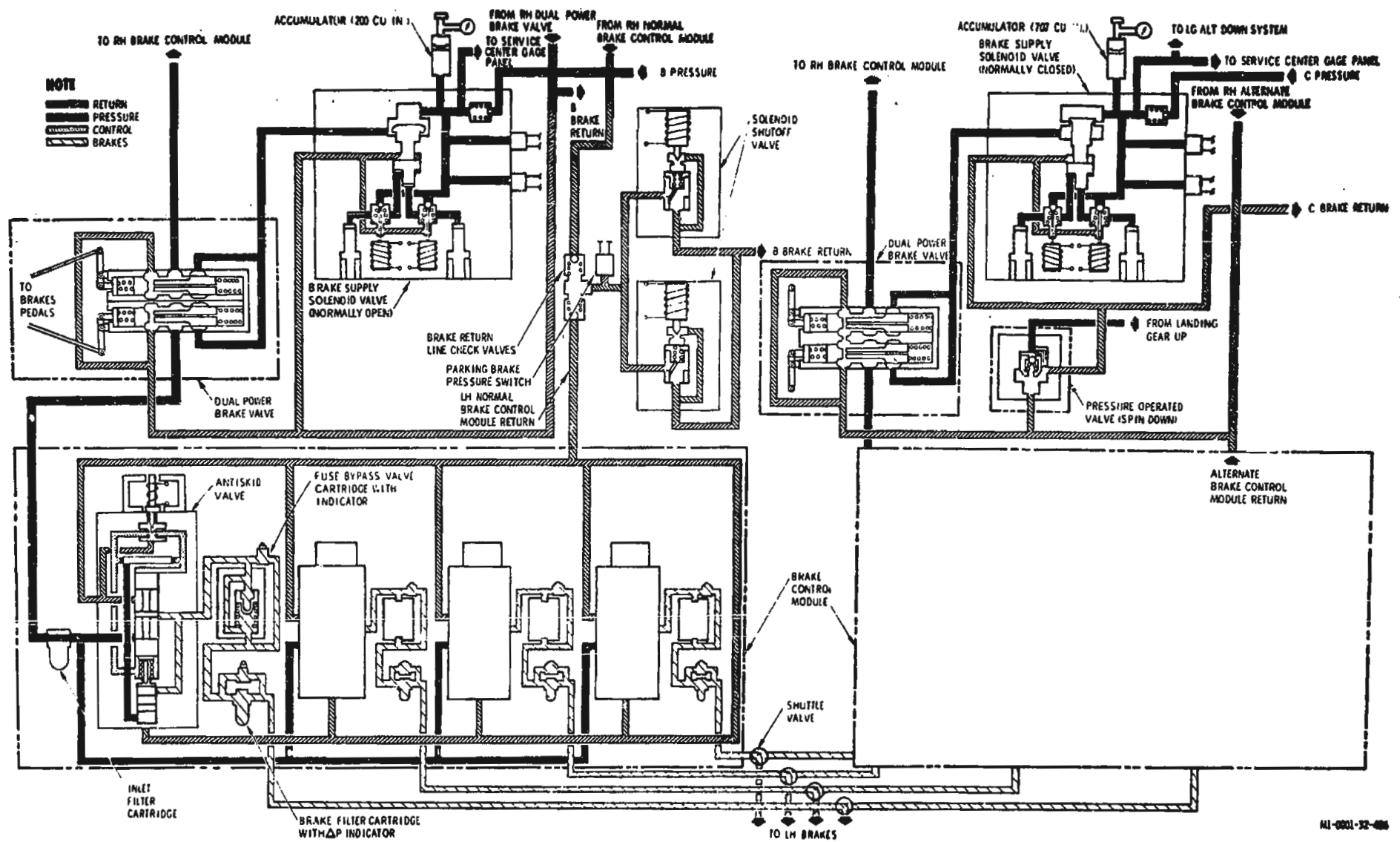
B. Operation

During normal operation hydraulic flow is through the inlet check valve, through the normally open module valve and out

R EFFECTIVITY: ALL

001B

32-43-00
Page 12
May 15/82



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Brake System Hydraulic Schematic
Figure 6

32-43-00
Page 13/14
Nov 15/86

EFFECTIVITY: ALL

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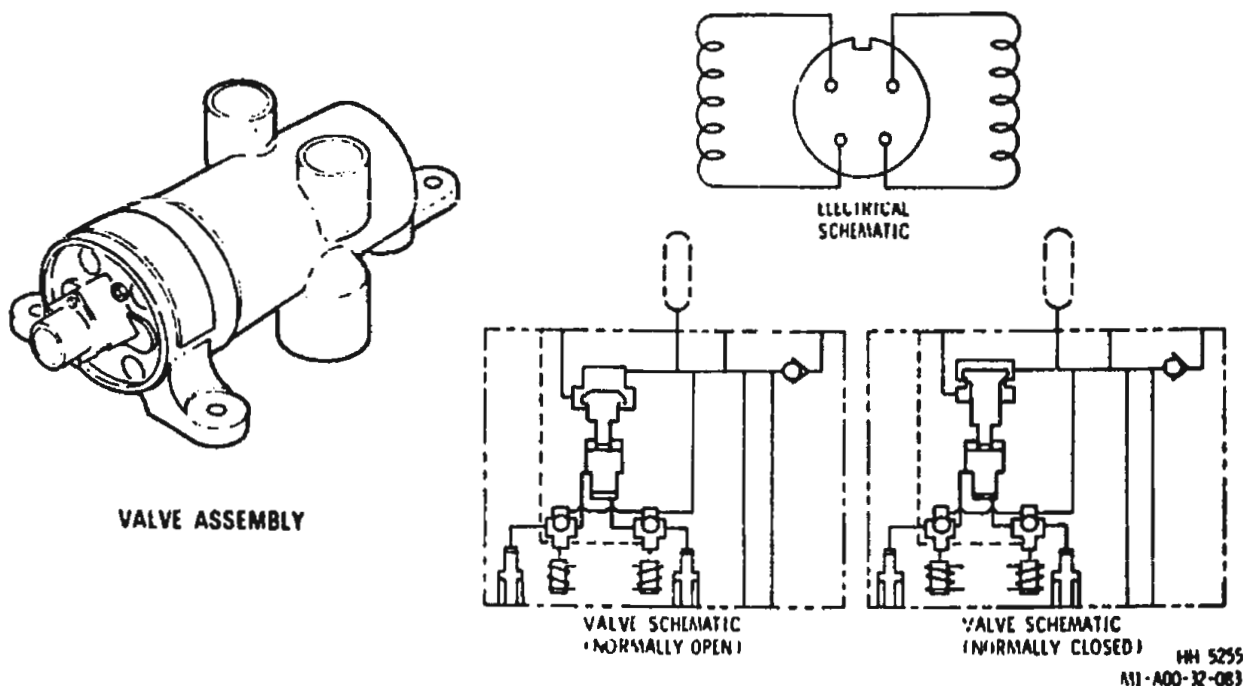
LOCKHEED
MAINTENANCE MANUAL

to the normal dual power brake valve. The normally closed module valve blocks hydraulic flow through that module. During alternate operation, the solenoid-actuated control valves open, which allows control pressure to actuate the module valves. The normally open module valve closes, and the normally closed module valve opens and directs hydraulic flow to the alternate dual power brake valves. When energized, the module valves close within 25 to 100 milliseconds; when deenergized, the module valves return to normal within 1 second. Energizing the valves causes hydraulic pressure to force the indicators out to indicate that the solenoid operated control valves are operational. The indicators will automatically retract after the valves have been deenergized.

4. Accumulators

A. Description and Operation

The brake system uses two accumulators (Ref. Fig. 8). A 200-cubic-inch capacity accumulator with an air/nitrogen reservoir is used in the normal system, and a 707-cubic-inch capacity accumulator is used in the alternate system, zone 147. Each accumulator is equipped with a charging valve and a pressure gage which indicates accumulator pressure. The



Brake Supply Module Assembly
Figure 7

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0018

EFFECTIVITY: ALL

32-43-00
Page 15
May 15/82



accumulators store energy for brake operation, dampen pressure fluctuations, and ensure instant fluid flow under pressure to the brakes.

5. Brake Control Mechanism, Cables and Linkage

A. Description

Two dual brake input mechanisms, one for each pilot, (Ref. Fig. 9) connect the brake pedals through cables and linkages to the dual power brake valves, located in the hydraulic service center. Override spring assemblies allow brake operation if either pilots system becomes locked or jammed.

On aircraft 001-014,
the parking brake controls are only incorporated in the Captains input mechanism.

On aircraft 015-999,
the parking brake controls are incorporated in the hydraulic service center for both pilots.

B. Operation

Movement of either pair of brake pedals is transmitted through brake rods and bellcranks to input cable quadrants. The cables carry the movement to brake bellcranks located in the hydraulic service center. Link rods, which incorporate override members, connect brake bellcrank movement to the dual power brake valves. The link rods that connect the dual power brake valves together transmit any movement through the opposite cables and linkage to the other pair of brake pedals.

6. Dual Power Brake Valve

A. Description and Operation

Brakes are controlled by two dual power brake valves (Ref. fig. 10). One dual valve controls the normal brake system, and the other dual valve controls the alternate brake system, zone 147. Each valve body is divided into two single valves. One single valve (aft) controls the right MLG brakes, and the other single valve (forward) controls the left MLG brakes. The two aft single valves and two forward single valves are linked together through the brake control mechanism. Each dual valve has four hydraulic connections: a common pressure port, a common return port, and two brake ports (right and left).

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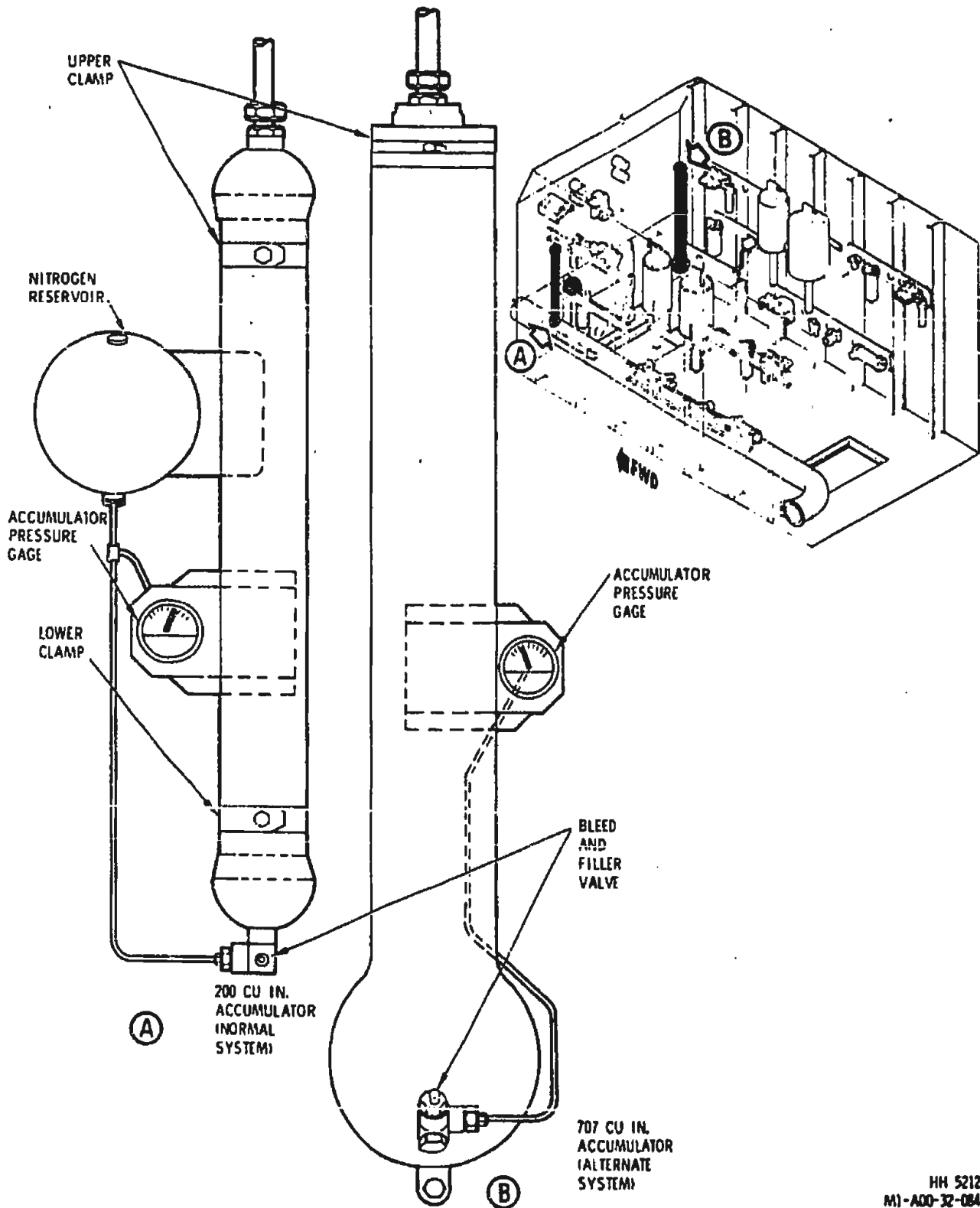
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0018

32-43-00

Page 16
May 15/82

LOCKHEED
MAINTENANCE MANUAL



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M1-A00-32-084

Brake System Accumulators
Figure 8

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32-43-00
Page 17
Sep 15/79



Application of brake pedal pressure, by either pilot, is transmitted to the dual valve lever assembly. The lever assembly, in turn, positions the valve piston to meter brake system pressure to the applicable brake. When brake pedal pressure is relaxed, the valve piston is positioned to vent brake hydraulic pressure to return.

7. Brake Assembly

A. Description

The eight identical MLG brake assemblies (Ref. Fig. 11) are of the multidisc type. The brake assemblies are installed on each axle, zones 731 and 741, with the torque arm of the brake carrier connected through the brake link to lugs on the MLG strut piston. Brake assemblies are interchangeable for any MLG axle. Hydraulic pressure is transmitted through a manifold coupling to a single port in the brake assembly carrier housing.

Seven rotating disc elements (rotors) are keyed to the main wheel assembly by keyway inserts. Rotors are of a segmented design to prevent warpage and distortion at high brake temperatures. Six stationary elements (stators) and two pressure plates (inboard fitted to actuator piston, and outboard fixed to torque plate) are fitted with replaceable linings. Seven actuators are connected to the movable (inboard) pressure plate. Six line-replaceable brake adjusters maintain brake clearance. Indicators on the brake assembly show brake wear. A bleeder valve is provided for brake servicing. A sensor is installed for temperature indication.

B. Operation

Hydraulic pressure from the dual brake valve is applied through the manifold coupling to the cylinder housing where it is distributed to seven actuators. The actuators, in turn, transmit the pressure to the inboard pressure plate to impart braking action. Brake adjusters compensate for brake lining wear, and using return springs, relieve brake disc pressure when hydraulic pressure is reduced.

8. Pressure-actuated Hydraulic Valve (Spindown Valve)

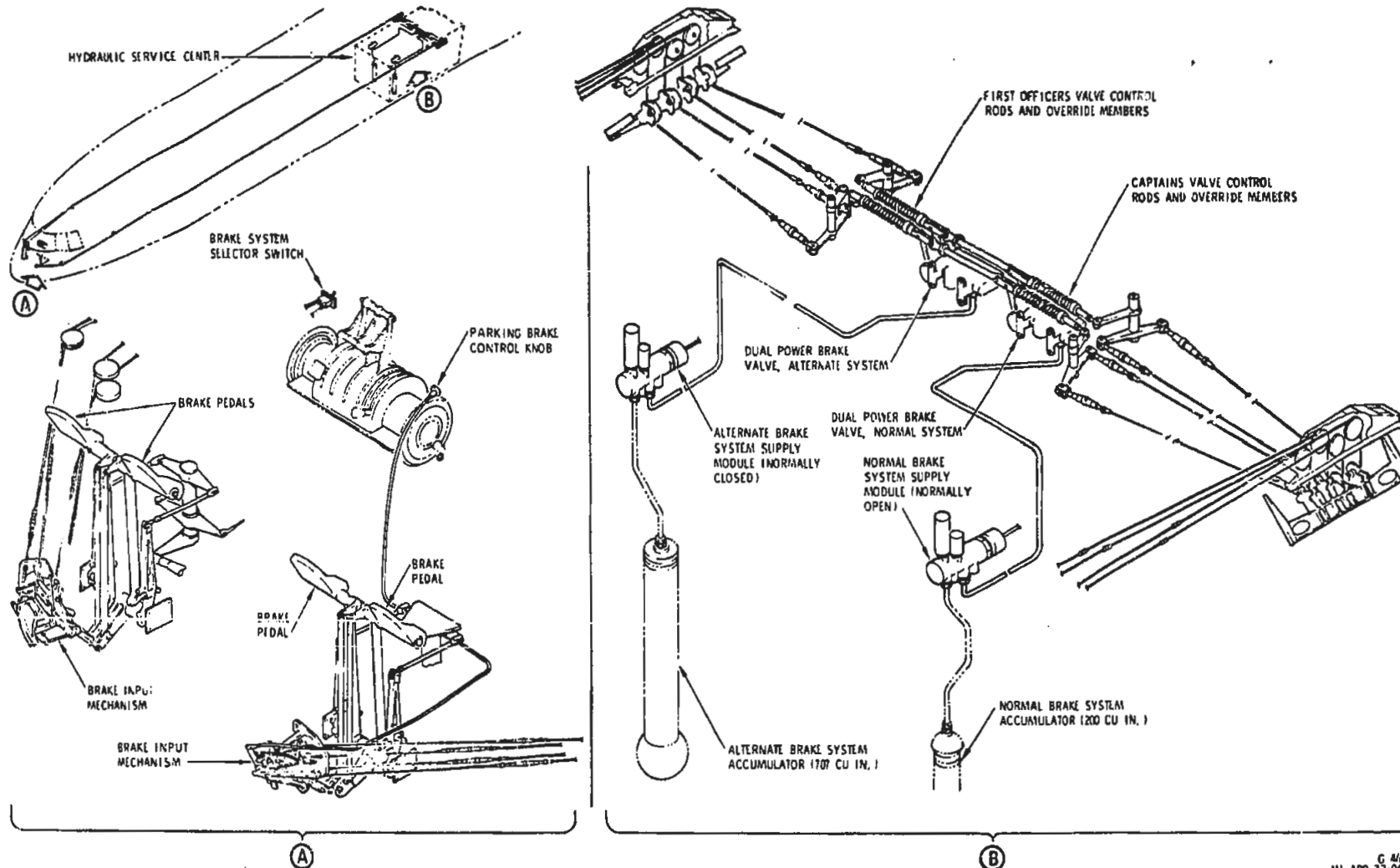
A. Description and Operation

R The pressure-actuated hydraulic valve (spindown valve) controls hydraulic brake pressure to stop MLG wheel rotation when the gear is retracted (Ref. Fig. 12). The valve is

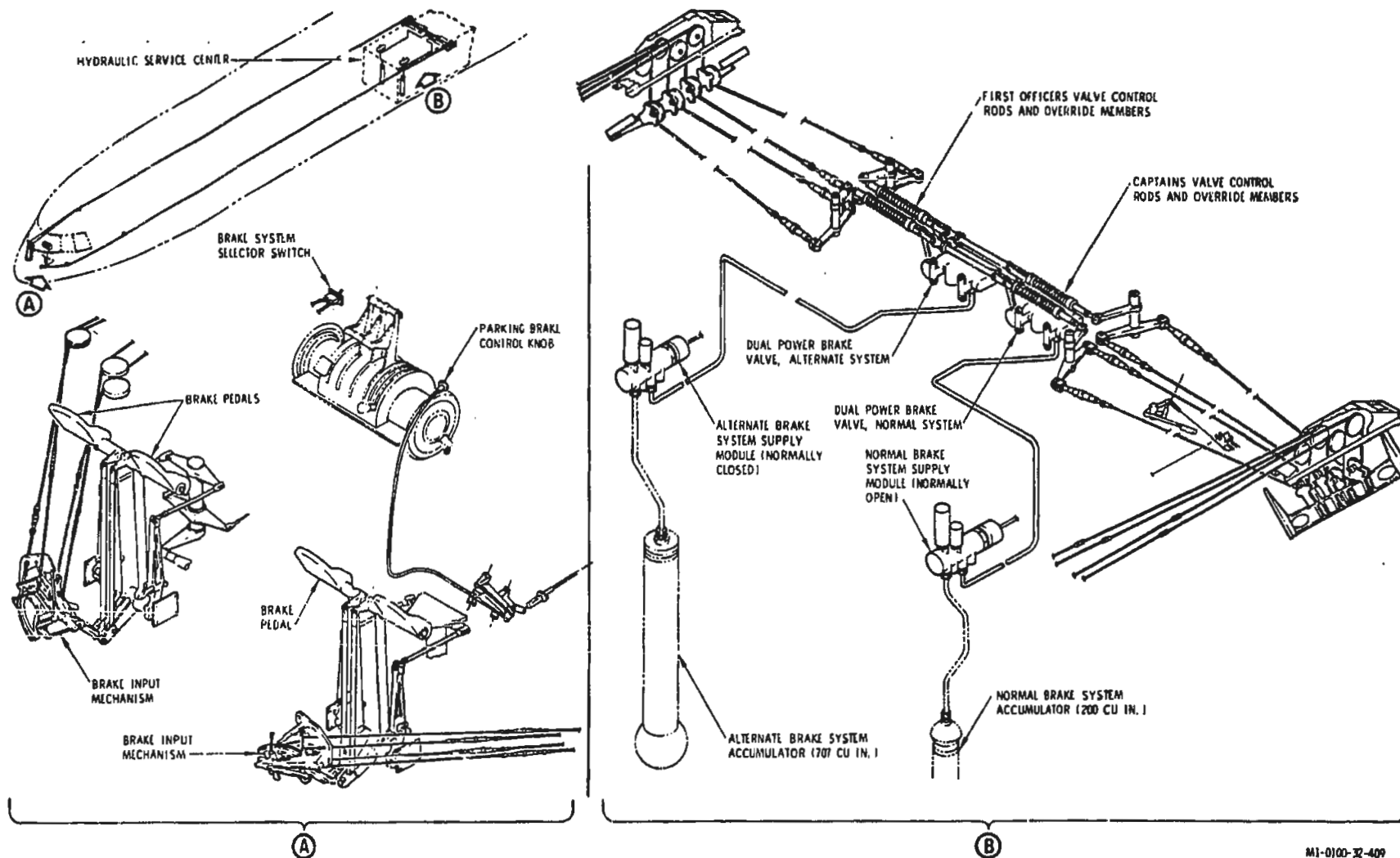
EFFECTIVITY: ALL

32-43-00

Page 18
Aug 15/81



Brake Controls Component Location
Figure 9



M1-0100-32-409

Brake Controls Component Location
Figure 9

LOCKHEED
MAINTENANCE MANUAL

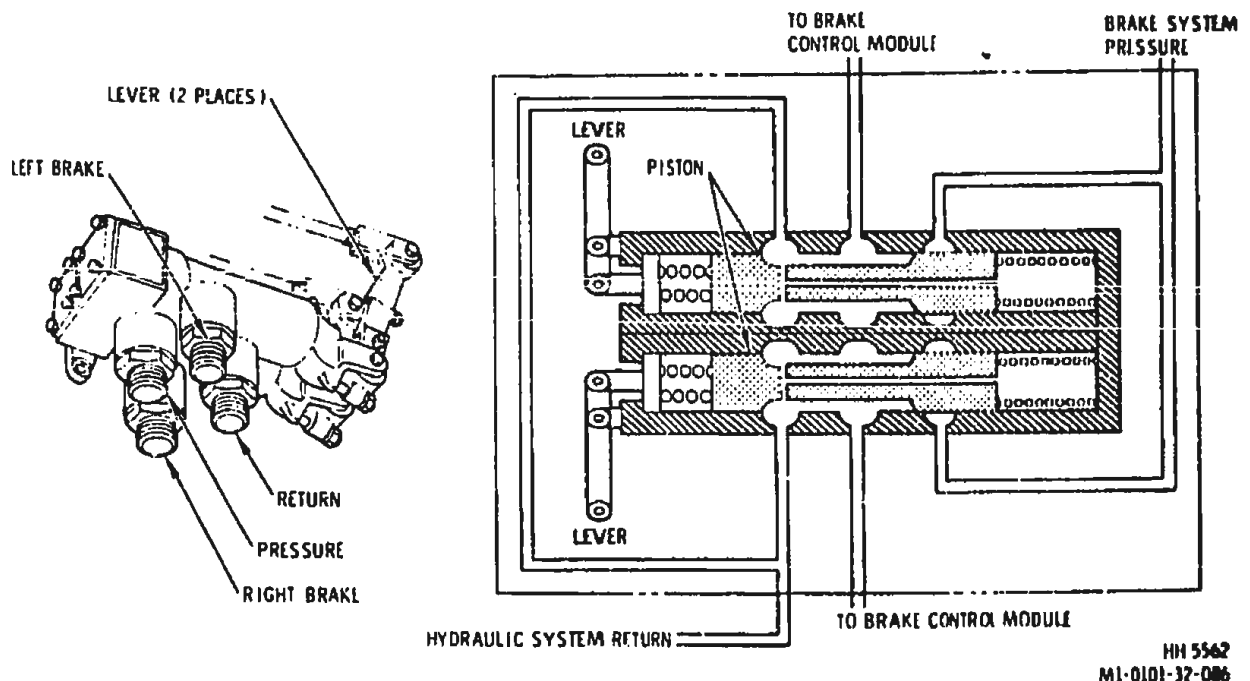
located in the hydraulic service center, zone 147. Gear-up pressure positions the valve so that the pressure is applied through the dual brake valve to the brake assembly. Pressure is applied until the landing gear control switch on the pilots center instrument panel, zone 210, is placed in the NEUTRAL position.

9. Return Shutoff Valve (Parking Brake)

A. Description and Operation

The return shutoff valve (parking brake) (Ref. Fig. 13) controls hydraulic brake return pressure from the brake control module for parking brake operation. The normally closed valve is actuated by electrical power. There are two valves, in parallel, in the normal brake system hydraulic return line, zone 147.

During parking brake operation, the valves are deenergized (closed), and return flow is stopped. Accumulator pressure on the brakes locks the wheels.

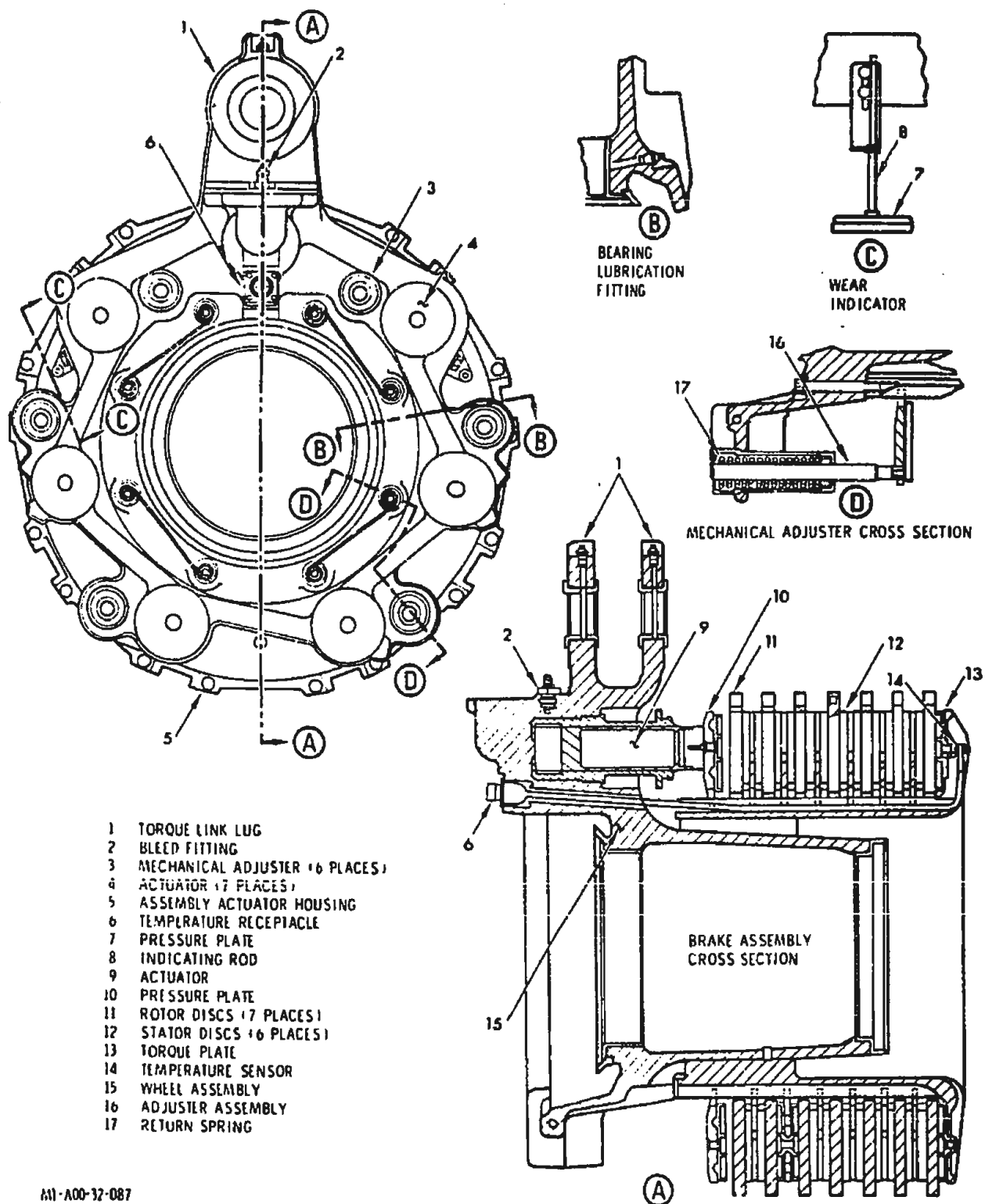


Dual Power Brake Valve
Figure 10

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001B EFFECTIVITY: ALL

32-43-00
Page 23
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



M1-A00-32-087

Brake Assembly
Figure 11

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R EFFECTIVITY: ALL
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32-43-00
Page 24
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL

10. Normal_System_Brake_Return_Line_Check_Valves

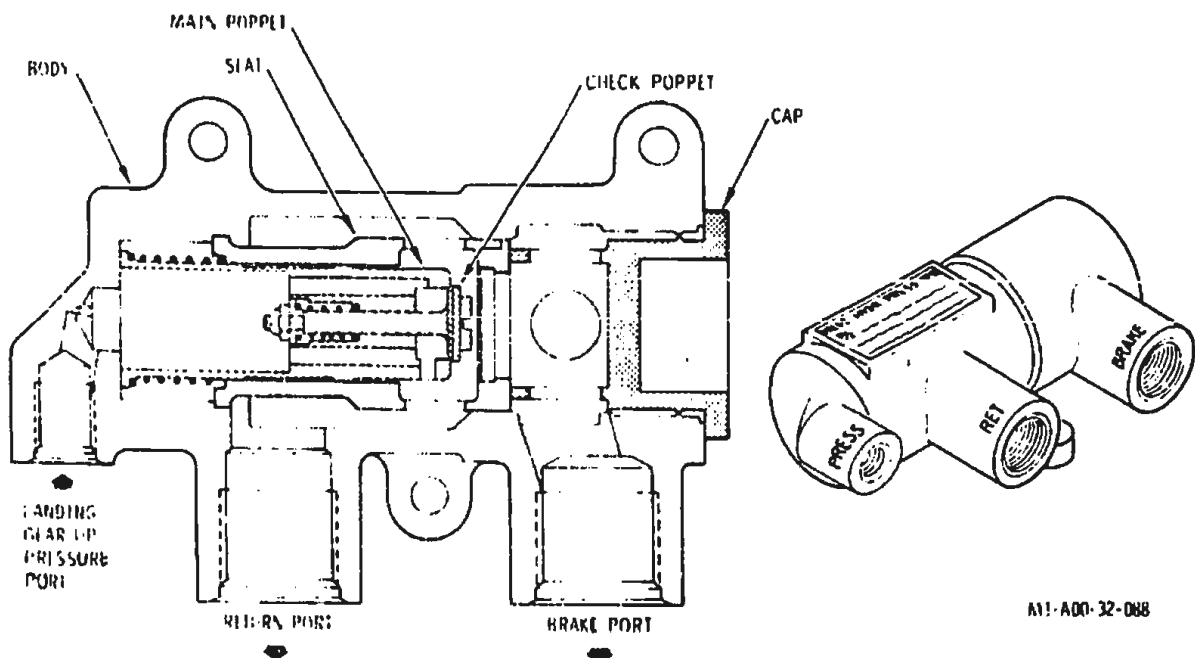
A. Description and Operation

The brake return line check valves are both contained in the same module (Ref. Fig. 14). Each valve prevents hydraulic, fluid flow back to its respective brake control module. Cross flow is thereby prevented in the event that there is a differential in return flow pressure from one brake control module to the other. Prevention of cross flow eliminates the possibility of return flow back through a dual power brake valve thereby increasing the time that parking brakes are applied.

11. Brake_Shuttle_Valve

A. Description and Operation

The brake shuttle valve provides a means by which hydraulic pressure, when applied by brake actuation, is applied to the brakes from either the normal or alternate brake system. The valve (Ref. Fig. 15) has two inlet ports, one outlet port, and a valve body containing a steel shuttle with a spring loaded ball detent.



Pressure Actuated Hydraulic Valve
Figure 12

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001B EFFECTIVITY: ALL

32-43-00
Page 25
Aug 15/81

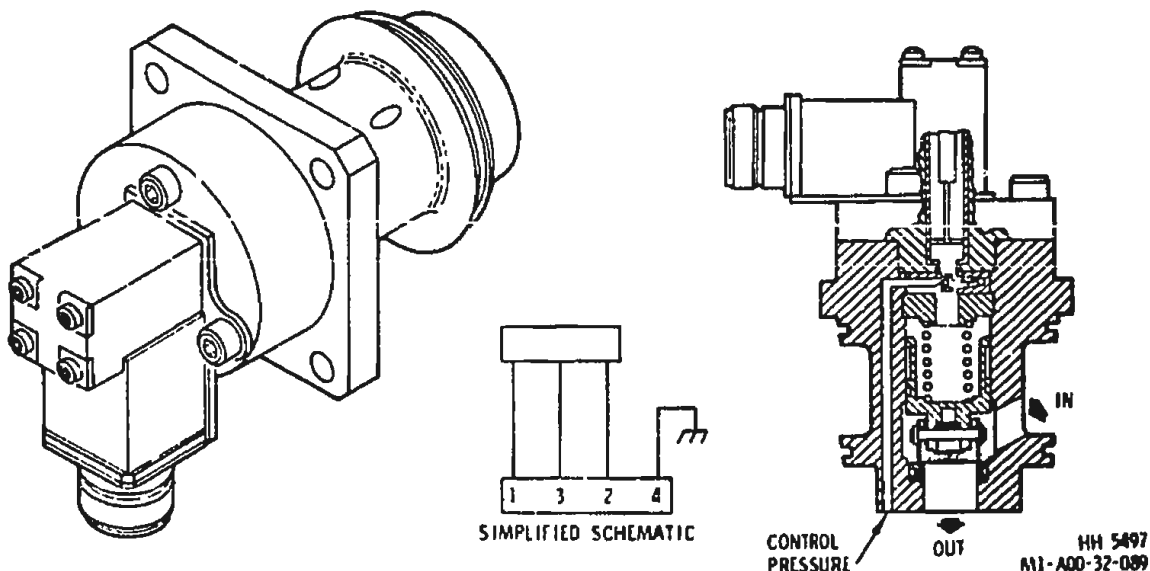


In operation, hydraulic flow from one inlet port to the outlet port is maintained with the shuttle seated. The seated shuttle valve closes the opposite inlet port. When pressure applied at the closed off port causes a predetermined differential pressure across the shuttle, the spring-loaded ball detent is overcome, and the shuttle snaps to close off the first inlet port. Fluid is allowed to flow to the outlet port from the second inlet port. The detent maintains positive closure of the inlet port in either position.

12. Hydraulic Brake Manifold Coupling

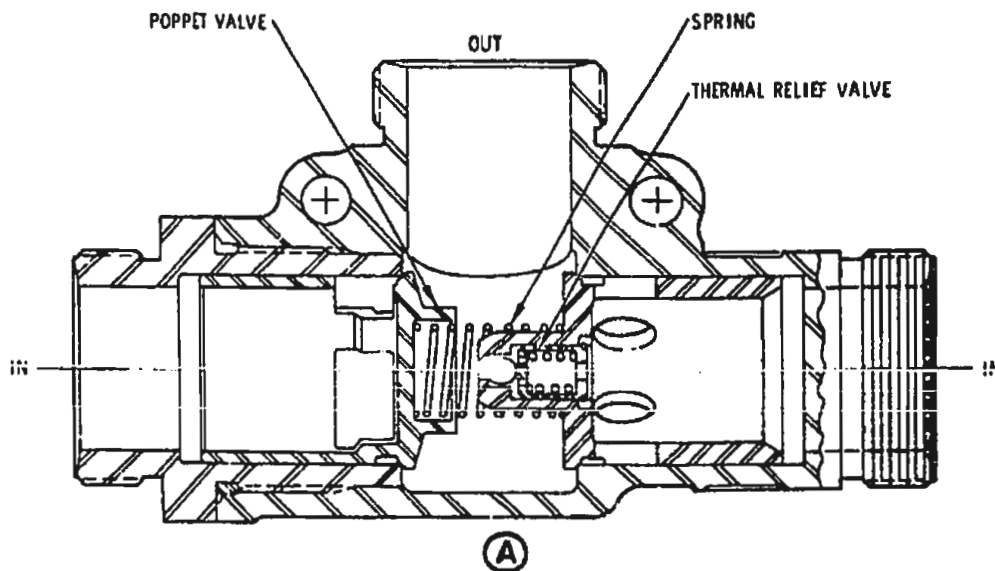
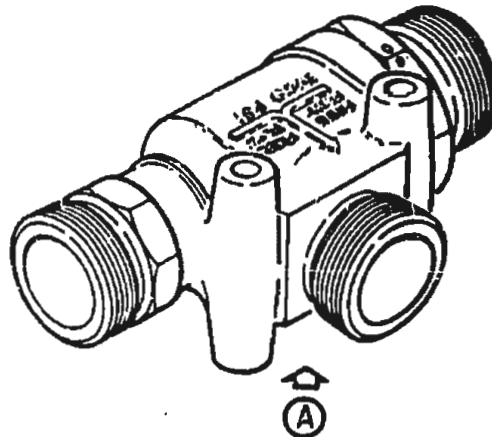
A. Description and Operation

The hydraulic brake manifold coupling assembly (Ref. Fig. 16) provides a means to connect or disconnect a hydraulic brake line to or from each brake assembly. The operation is performed with practically no air entrapment or fluid leakage. Each coupling assembly consists of two parts: the manifold and the nipple. The manifold is connected to the brake line, and the nipple is installed into the brake assembly. When disconnected, the coupling assembly shutoff valves seal to prevent fluid from escaping. A 10-degree rotation, clockwise or counterclockwise, of the coupling



Return Shutoff Valve (Parking Brake)
Figure 13

LOCKHEED
MAINTENANCE MANUAL



NOTE

THERMAL RELIEF OCCURS AT 550 PSI.
VALVE CLOSSES AT 450 PSI

MI-0100-32-485

Brake Return Line Check Valves
Figure 14

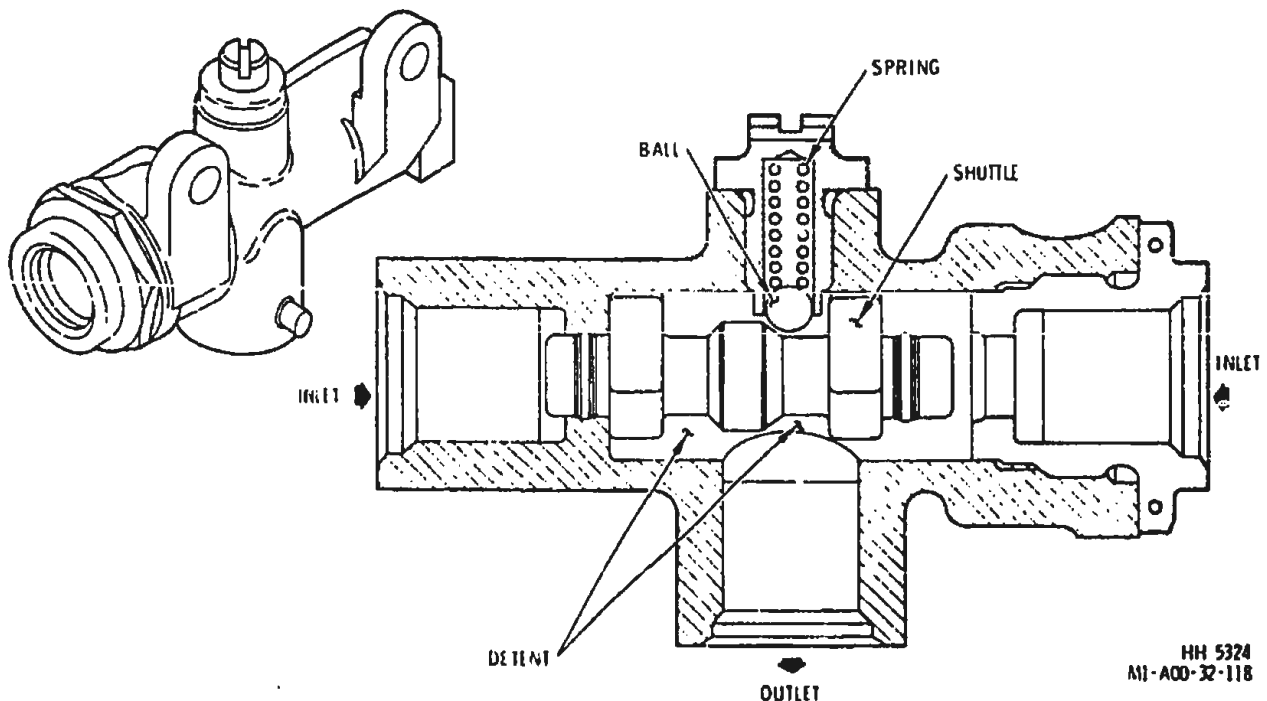
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EFFECTIVITY: ALL

32-43-00
Page 27
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL

assembly actuates the shutoff valves. To disconnect, the coupling assembly always rotates in the direction which moves the brake line toward the centerline of the truck (Ref. Fig. 16).



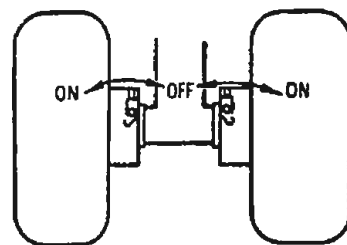
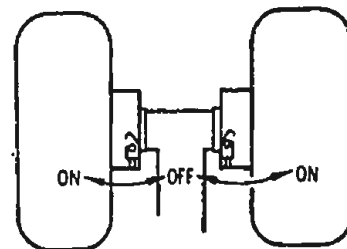
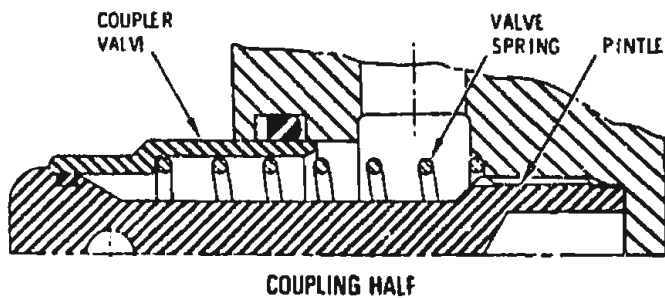
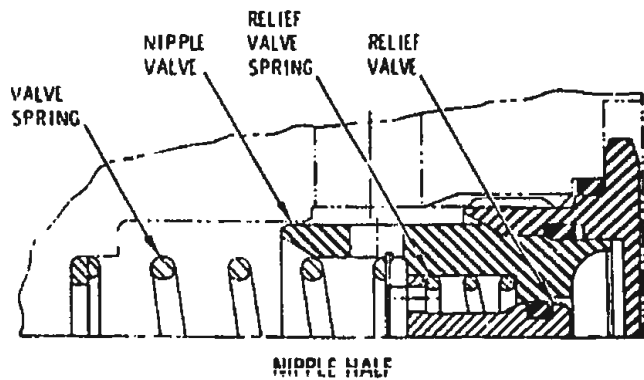
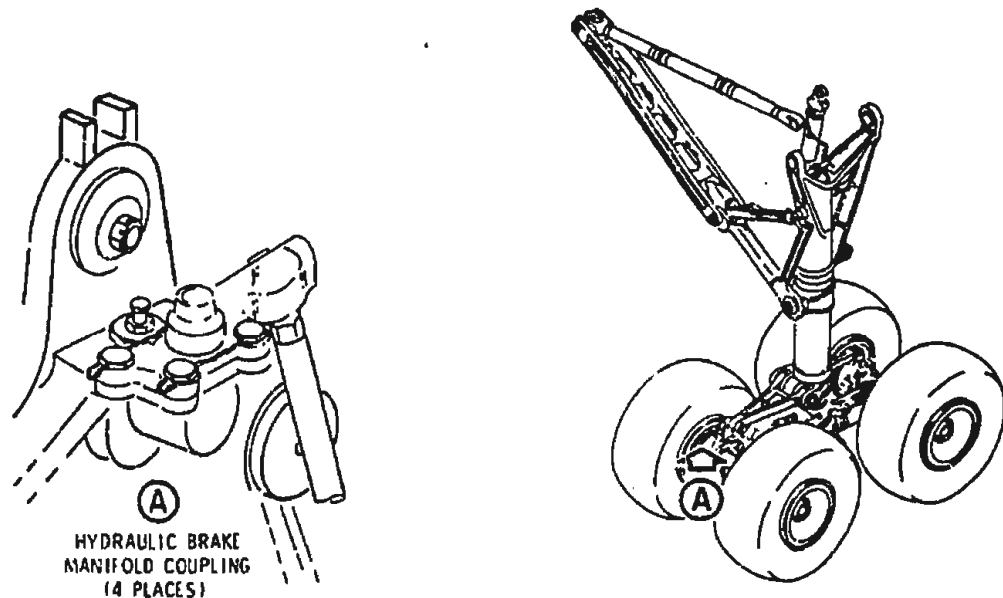
HH 5324
NI-A00-32-118

Brake Shuttle Valve
Figure 15

R EFFECTIVITY: ALL
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32-43-00
Page 28
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



COUPLING LOCATIONS
ON BRAKE ASSEMBLIES

HH 6610
M1-0100-32-157

Hydraulic Brake Manifold Coupling
Figure 16

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001B EFFECTIVITY: ALL

32-43-00
Page 29/30
Aug 15/81



BRAKE SYSTEM - FAULT ISOLATION

1. General

Reference data and fault isolation procedures for troubleshooting landing gear system faults are included in this section of the manual. A landing gear system malfunction detected by the flight crew is normally entered in the aircraft flight log book and reported to maintenance personnel by a FIRM fault code number. This number and the flight log book write-up can be found in the Chapter 32 Fault Code Index. The index specifies the maintenance manual section, fault isolation diagram figure number and, where appropriate, a block number indicating the diagram entry point containing the fault isolation procedure. When no block number is specified, the diagram entry point is block 1.

Prerequisites listed at the top of each diagram identify mandatory preliminary steps and circuit breakers that must be closed before initiating any fault isolation step.

Schematic diagrams, identified by a SCHEM number, supplement fault isolation procedures as maintenance aids. The schematics show the basic system circuitry necessary for troubleshooting and include cross-reference indexes to the wiring diagram manual pages required for checking component interconnect wiring.

2. Fault Isolation

Table 101 is a list of fault isolation data in this section of the manual.

Brake System Fault Isolation
Table 101

FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
103	Brake Application Faults
104	Brake Temperature Abnormal
R 105	Brake Noisy or Grab at Low Speed
SCHEM 1	Brake System Electrical Schematic

EFFECTIVITY: ALL

001B

32-43-00
Page 101
Nov 15/84

LOCKHEED
MAINTENANCE MANUAL

COMPONENT	QTY	AREA/ACCESS	REFERENCE
BRAKE ASSEMBLY, MLG	8	R&L MLG TRUCKS	32-43-01
CABLE, BRAKE "APPLIED"	4	FESC, 112AB; HSC, 147AB	91-32-43
CABLE, BRAKE "OFF"	4	FESC, 112AB; HSC, 147AB	91-32-43
RETURN SPRINGS, BRAKE	4	HSC, 147AB	32-43-22
VALVE:			
ANTI-SKID CONTROL	16	MLG STRUT WELL	32-44-02
BRAKE SHUTTLE	8	REAR SPAR; 541AB, 641AB	32-43-03
DUAL POWER BRAKE	2	HSC; 147AB	32-43-04

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Component Location Index
Figure 101

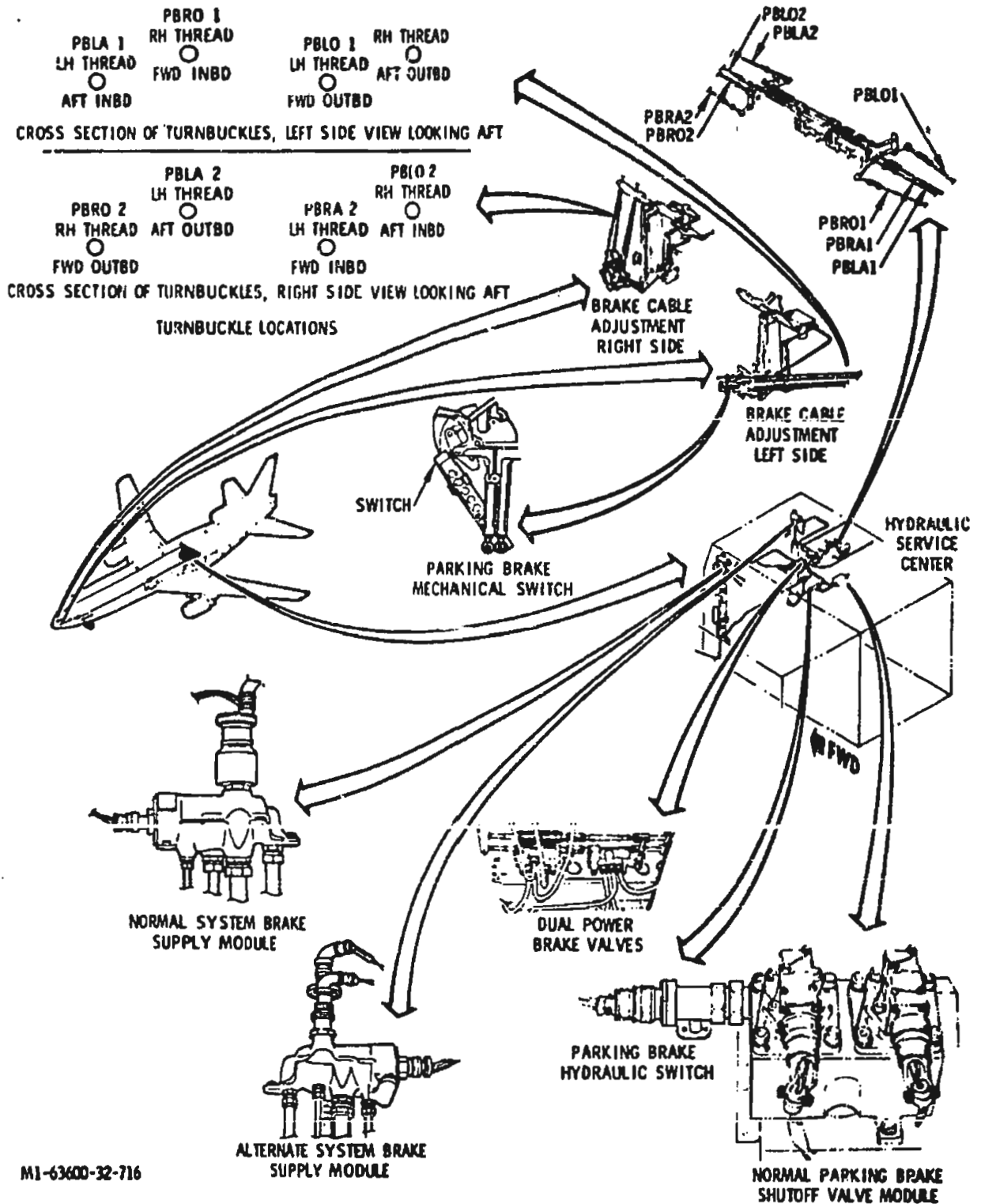
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32-43-00
Page 102
Mar 15/81

LOCKHEED

MAINTENANCE MANUAL



M1-63600-32-716

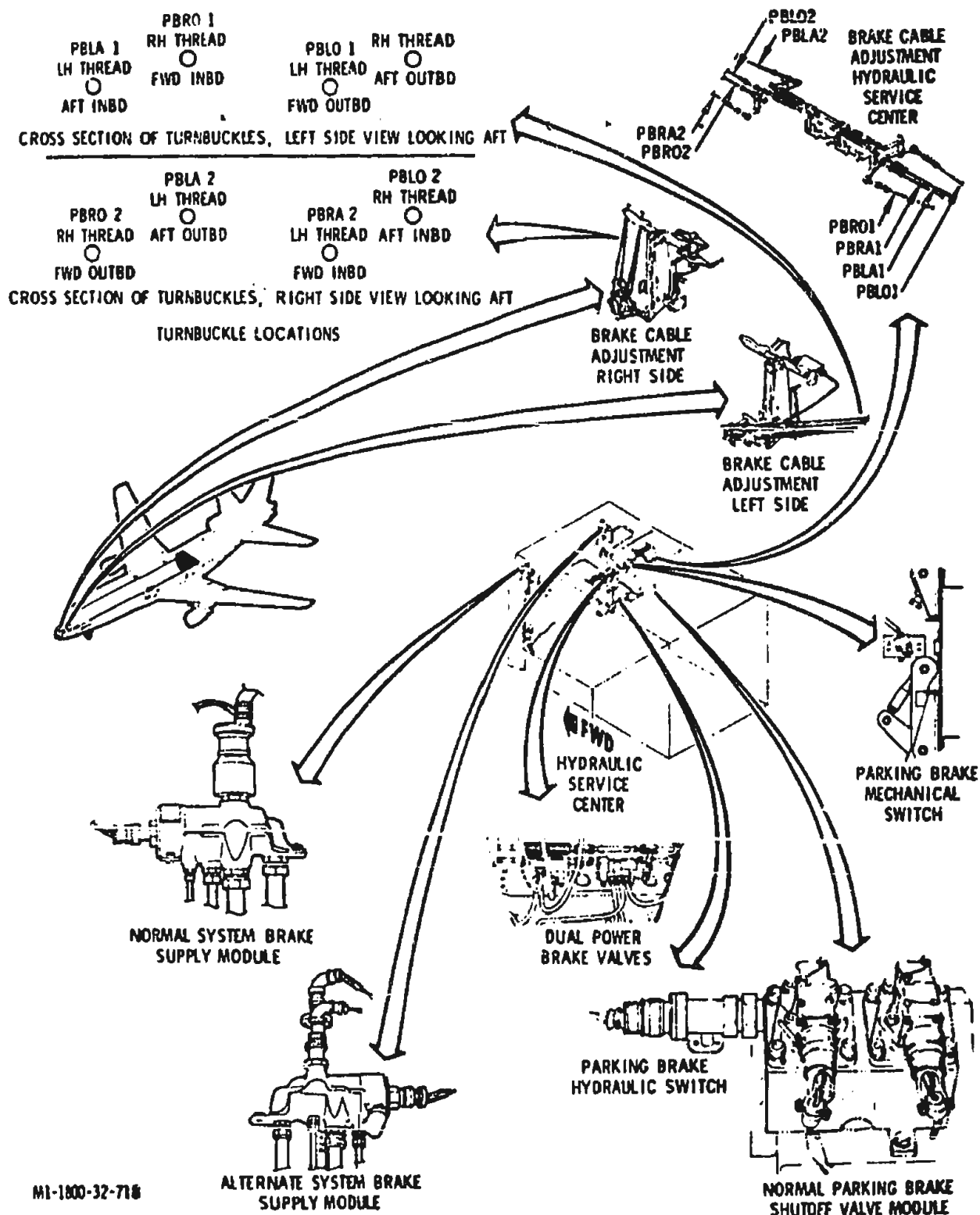
Brake System Component Locator
Figure 102 (Sheet 1)

EFFECTIVITY: 001-014

32-43-00
Page 103
Mar 15/81

001B

LOCKHEED
MAINTENANCE MANUAL



Brake System Component Locator
Figure 102 (Sheet 1)

EFFECTIVITY: 015-999

32-43-00

Page 104
Mar 15/81

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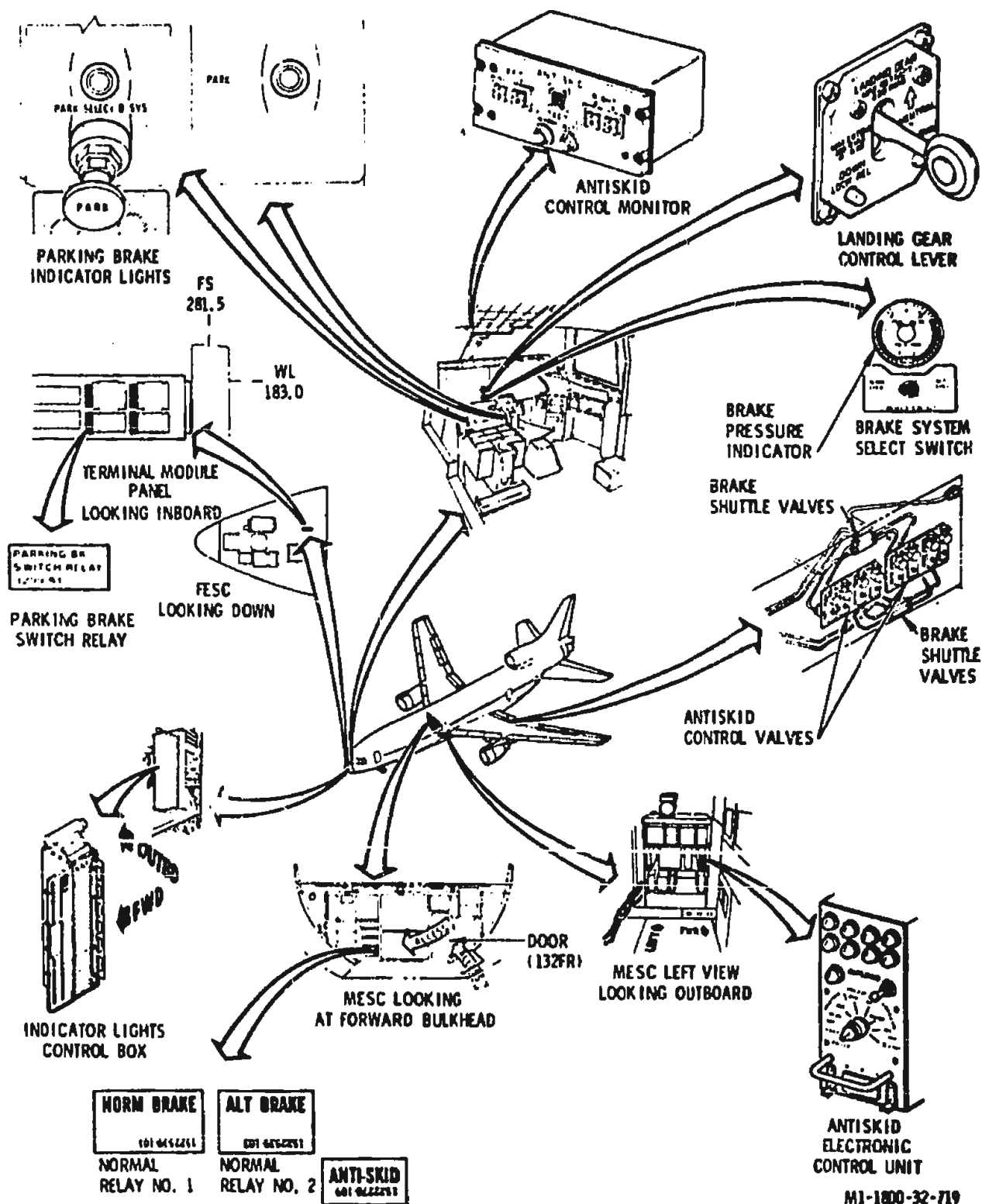


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LOCKHEED
MAINTENANCE MANUAL



Brake System Component Locator
Figure 102 (Sheet 2)

EFFECTIVITY: 015-999

32-43-00

Page 106
Mar 15/81

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LOCKHEED

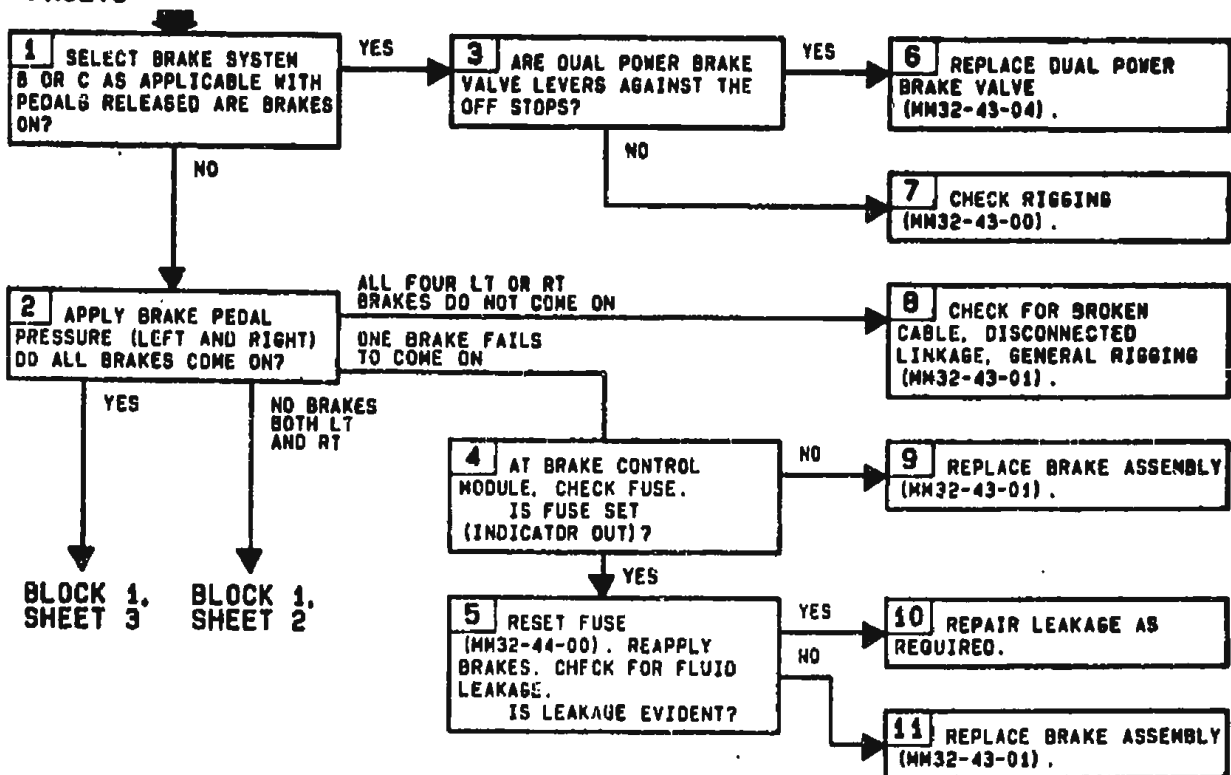


MAINTENANCE MANUAL

PREREQUISITES

ELECTRICAL POWER (MM24-00-00)
LANDING GEAR DOWNLOCK SAFETY PINS INSTALLED
HYDRAULIC SYSTEM B OR C
PRESSURIZED AS APPLICABLE (MM28-11-00)
CD'S IN: CD2-618, 622

BRAKE APPLICATION FAULTS



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Brake Application Faults
Figure 103 (Sheet 1)

EFFECTIVITY: ALL

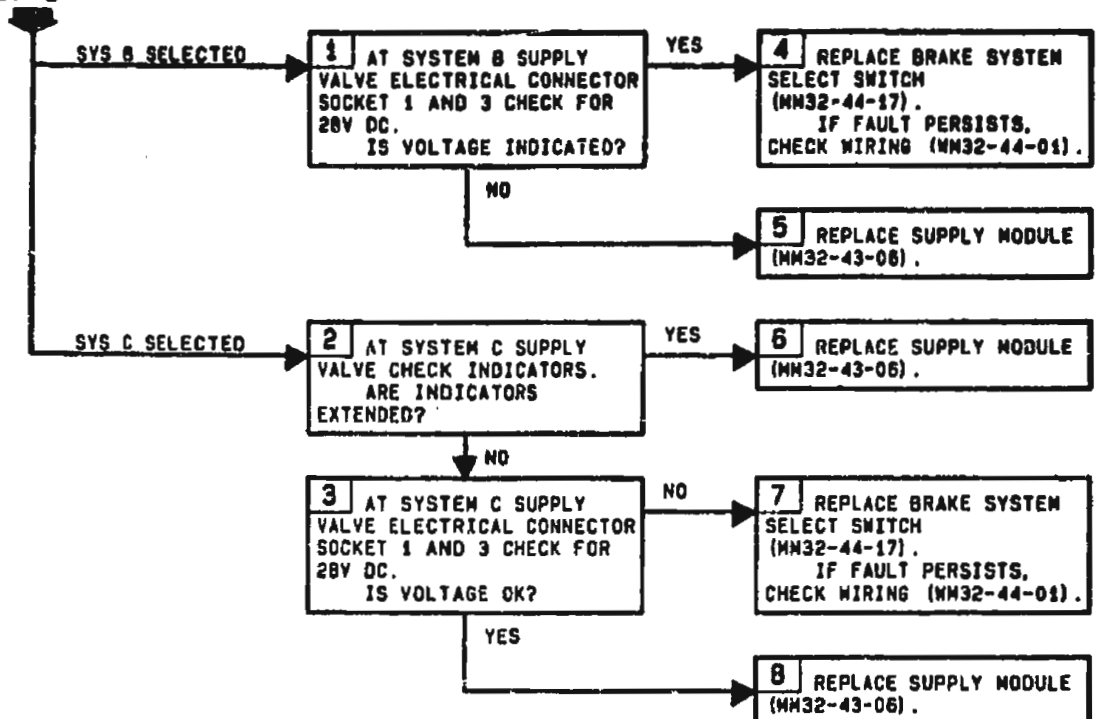
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32-43-00
Page 107
Nov 15/87

LOCKHEED
MAINTENANCE MANUAL

PREREQUISITES
SEE SHEET 1

**FROM BLOCK 2
SHEET 1**



M1-0000-32-3059

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**Brake Application Faults
Figure 103 (Sheet 2)**

EFFECTIVITY: ALL

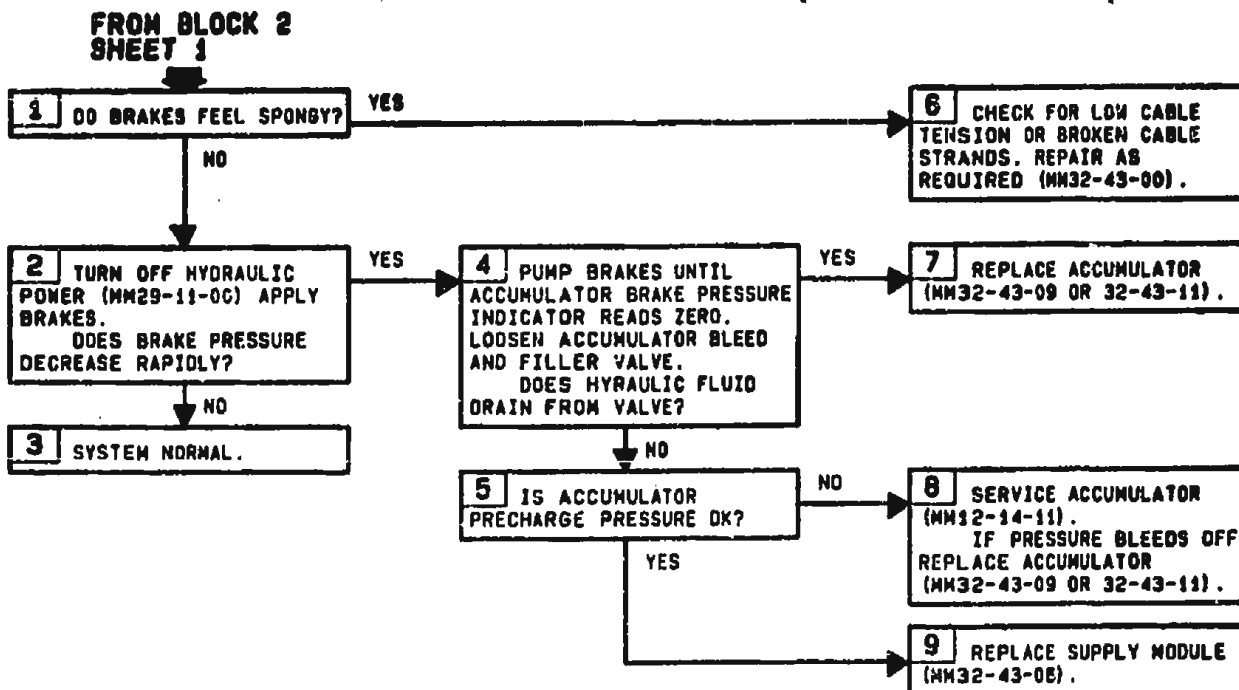
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32-43-00
Page 108
Nov 15/87

LOCKHEED

MAINTENANCE MANUAL

PREREQUISITES
SEE SHEET 1



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Brake Application Faults
Figure 103 (Sheet 3)

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EFFECTIVITY: ALL

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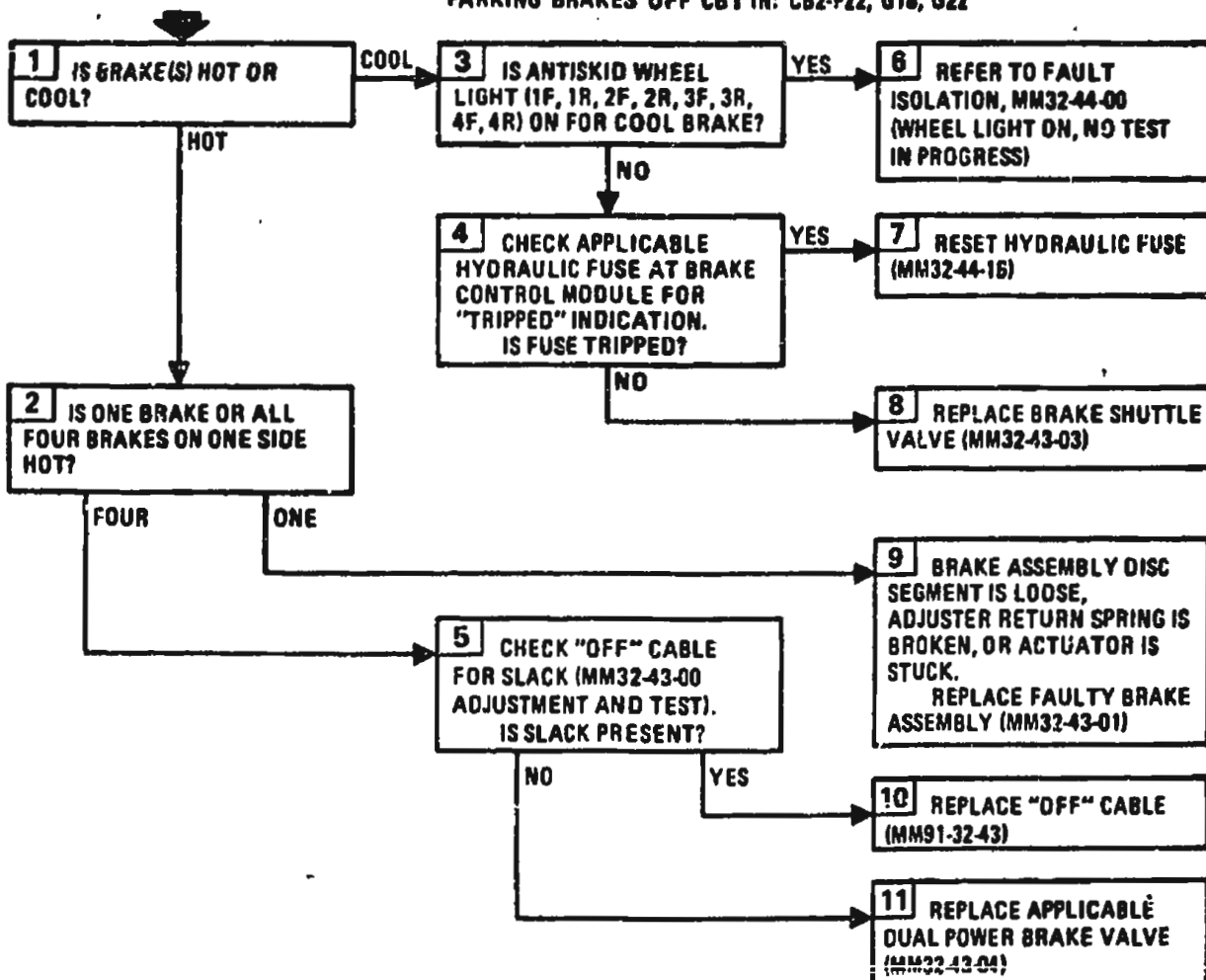
32-43-00
Page 109
Nov 15/87



PREREQUISITES

ELECTRICAL POWER ON (MM24-00-00)
LANDING GEAR CONTROL LEVER DOWN
ANTISKID MONITOR ON/OFF SWITCH LATCHED IN
PARKING BRAKES OFF CB's IN: CB2-F22, G18, G22

BRAKE TEMPERATURE ABNORMAL



M1-0003-32-844

Brake Temperature Abnormal
Figure 104

R EFFECTIVITY: ALL
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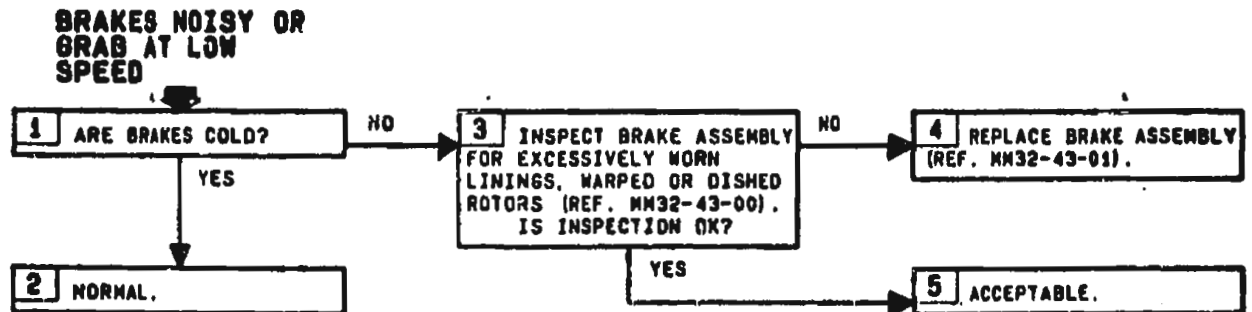
32-43-00
Page 110
Nov 15/87

LOCKHEED



MAINTENANCE MANUAL

PREREQUISITES
NONE



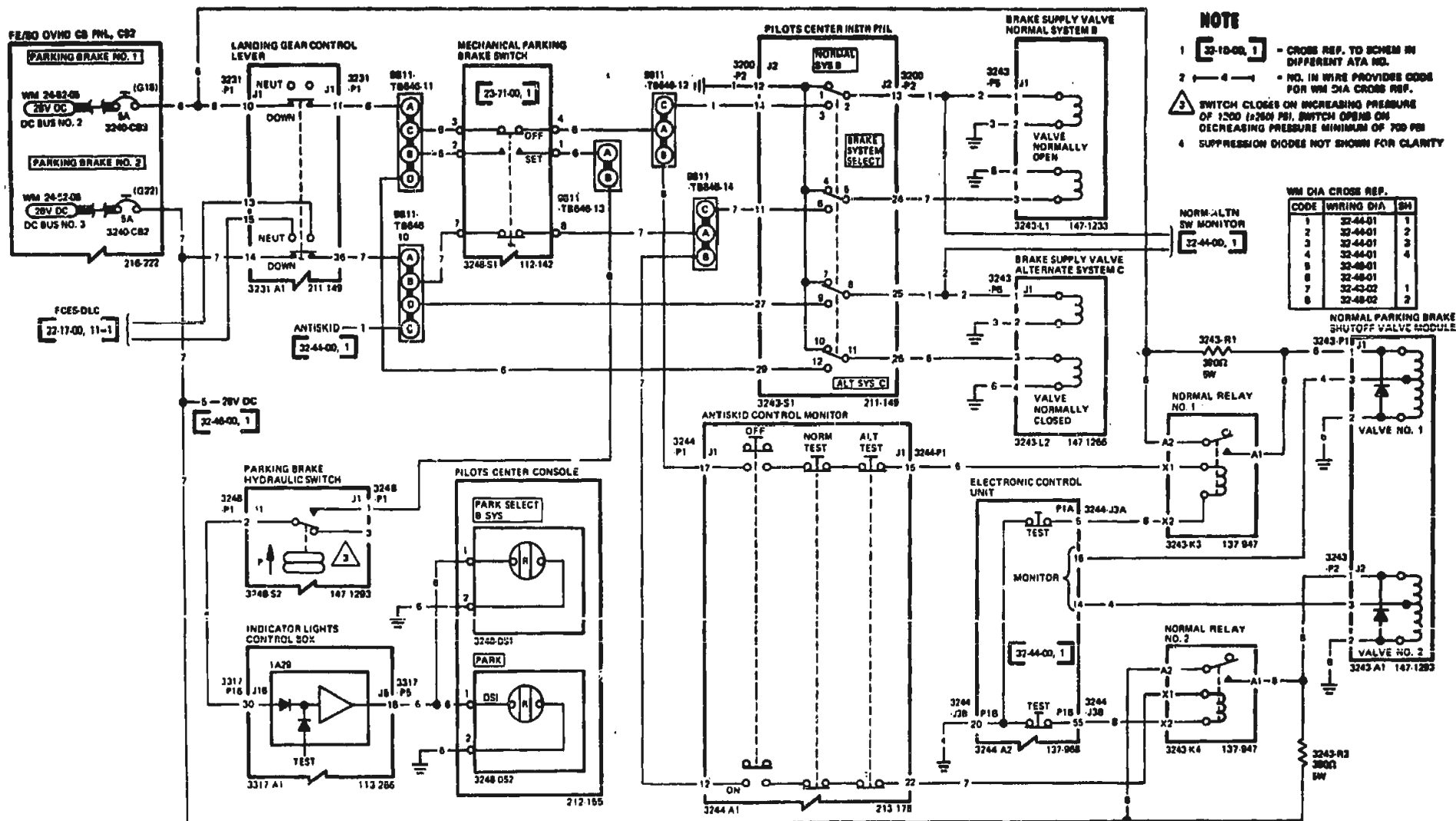
M1-0000-32-2879

Brakes Noisy or Grab at Low Speed
Figure 105

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EFFECTIVITY: ALL

32-43-00
Page 111/112
Nov 15/87

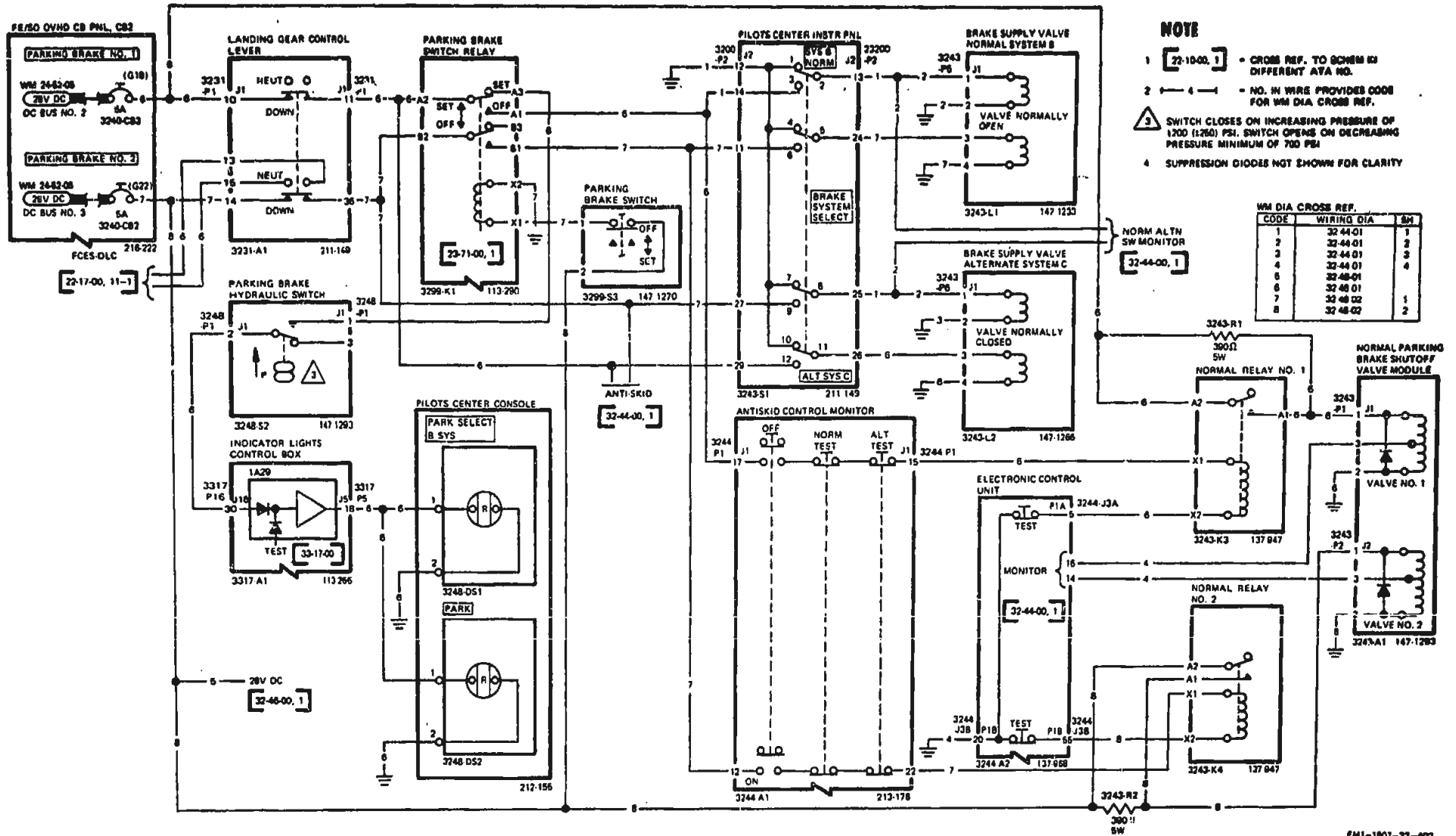


Brake System Electrical Schematic
SCHEM 1

R EFFECTIVITY: 001-014
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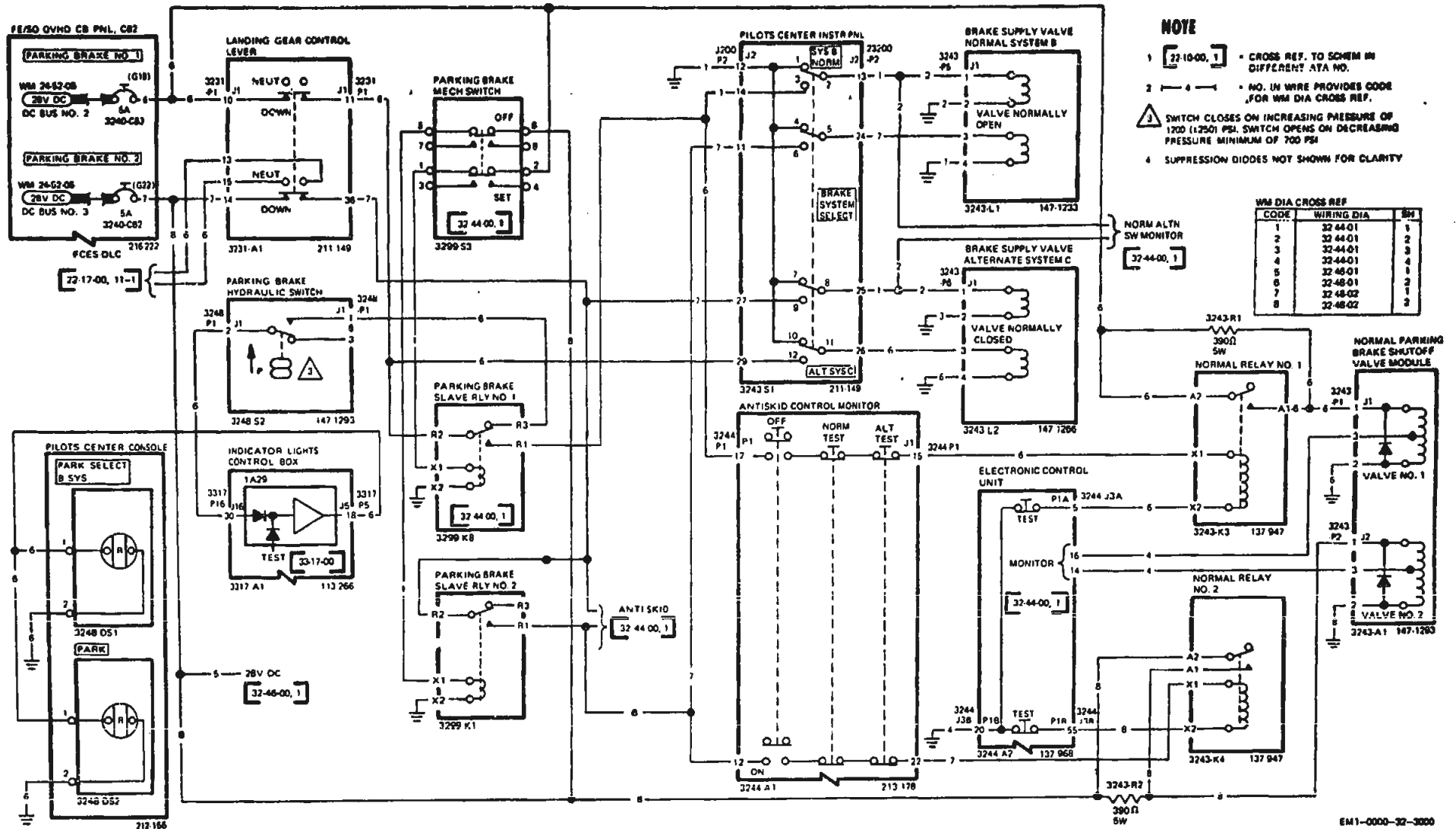
32-43-00
Page 113/114
Nov 15/87

EM1-63808-32-018



Brake System Electrical Schematic
SCHEM 1

32-43-00
Page 115/116
Nov 15/87



Brake System Electrical Schematic
SCHEM 1

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR BRAKE SYSTEM - MAINTENANCE PRACTICES

1. Equipment and Materials

Hydraulic Cart (for fluid replenishment)

Brake Bleed Hose Assembly, P/N 1302915-105, or equivalent

R Receptacle or drain bucket

2. Referenced Procedures

12-13-01 Hydraulic Bootstrap Reservoir - Servicing

24-00-00 Electrical Power - Maintenance Practices

29-11-00 Hydraulic Power System - Maintenance Practices

3. Maintenance Practices

C The brake hydraulic system must be bled whenever a component of the brake system is replaced, or whenever a hydraulic line is opened. All bleeding is performed through the applicable system return line, through the brake zero-leak disconnect fitting, through the brake assembly bleed fitting, or a combination of all three or any two procedures.

C Brake system pressure is hydraulic system pressure. The manner in which the B or C system is pressurized depends upon the maintenance status of the aircraft and the availability of ground support equipment. Aircraft electric motor-driven pumps, a ground hydraulic cart, or the air turbine motor (ATM) using a ground start cart can be used to pressurize hydraulic system B or C.

CAUTION: MAIN LANDING GEAR (MLG) WHEELS MUST BE CHOCKED FORWARD AND AFT BEFORE REDUCING BRAKE SYSTEM PRESSURE.

A. Bleeding Brake System Upstream of Brake Control Module

NOTE: This bleeding procedure applies to the following: brake supply modules, accumulators (hydraulic side only), dual power brake valves, and all hydraulic lines upstream of the dual brake control module.

CR

(1) Turn on electrical power (Ref. 24-00-00).

EFFECTIVITY: ALL

001B

32-43-00

Page 201
Jul 15/83

LOCKHEED
MAINTENANCE MANUAL

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (2) Turn on applicable hydraulic system B or C pressure (Ref. 29-11-00).
- (3) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, ensure that PARKING BRAKE NO. 1 (G18), PARKING BRAKE NO. 2 (G22), and BRAKE PRESS IND (G21) circuit breakers are in the closed position.
- (4) On the pilots center instrument panel, zone 210, place BRAKE SYS SELECT switch in NORM SYS B or ALT SYS C position, as applicable.
- (5) Depress brake pedals three or four times.
- (6) Turn off applicable hydraulic system B or C pressure (Ref. 29-11-00).
- (7) Turn off electrical power (Ref. 24-00-00).
- (8) Bleed air from applicable B or C hydraulic system (Ref. 12-13-01).

CR B. Bleeding Brake System Downstream of Brake Control Module

CR **NOTE:** This bleeding procedure applies to any component
CR contained in the brake control module, the brake
CR shuttle valves, the zero-leak brake disconnects, and
CR all hydraulic lines downstream of the brake control
CR module. Secure hose to prevent whipping. All four
CR brake assemblies, associated with a brake control
CR module, must be bled after removal and installation
CR of an antiskid valve or a brake control module inlet
CR filter.

- (1) Turn on electrical power (Ref. 24-00-00).

EFFECTIVITY: ALL

001B

32-43-00
Page 202
Jul 15/83



MAINTENANCE MANUAL

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (2) Turn on applicable hydraulic system B or C pressure (Ref. 29-11-00).
- (3) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, ensure that PARKING BRAKE NO. 1 (G18), PARKING BRAKE NO. 2 (G22), and BRAKE PRESS IND (G21) circuit breakers are in closed position.
- (4) On pilots center instrument panel, zone 210, place BRAKE SYS SELECT switch in NORM SYS B or ALT SYS C position, as applicable.
- (5) Install brake bleed kit flexible hose to brake assembly bleed fitting. Lead hose into clean container.
- (6) Hold open applicable brake control module hydraulic fuse bypass valve.
- (7) Depress applicable brake pedal until fluid coming out of hose is clear and free of bubbles or froth.
- (8) Close bleed valve and remove hose.
- (9) Ensure that brake control module hydraulic fuse bypass valve is closed.
- (10) Turn off electrical power (Ref. 24-00-00).
- (11) Turn off applicable hydraulic system B or C pressure (Ref. 29-11-00).

C 4. Maintenance Notes, Data, Tolerances, and Regulations

C A. High Pressure, Alternate Brake System "C"

- C (1) Pressure buildup to 4000 psi when brake are selected to
C the normal ("B") brake system can be expected. This is
C caused by system pulsations which progressively

R EFFECTIVITY: ALL
R
001B

32-43-00
Page 203
Jul 15/83

LOCKHEED



MAINTENANCE MANUAL

- . C increase the accumulator pressure due to the fluid trap
- C between the normally closed "C" brake supply valve and
- C the isolation check valve.

- C (2) Pressure buildup above 4000 psi indicates a malfunction,
- C of the thermal relief in the "C" brake supply valve.
- C If this occurs the brake supply valve should be
- C replaced at a convenient maintenance operation or
- C layover. Immediate action is not required since burst
- C pressure is in excess of 7000 psi.

R EFFECTIVITY: ALL

R
001B

32-43-00
Page 204
Jul 15/83

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR BRAKE SYSTEM - ADJUSTMENT AND TEST

1. General

The brake control system must be rigged after repair or replacement of linkage, cables, or replacement of dual power brake valves. Adjustments are made to the aft linkage until the dual power brake valves are in the off position. Cable tension is adjusted. Input linkage is adjusted to correctly position the brake pedals for angle position.

Hydraulic pressure is checked at the brake assemblies. Brakes are checked for operation and response.

Parking brake linkage is checked and adjusted for lock-in of the parking brake mechanism and control.

The temperature of the aircraft and cables should be stabilized for a minimum of one hour prior to rigging of the brake control system. Air conditioning equipment should not be operated prior to, or during, rigging. The specified tension is based on a temperature of 70 degrees Fahrenheit. The temperature-tension compensation chart (Ref. Fig. 501) must be referred to, when rigging at other temperatures. Cable tension tolerance is ± 5 percent. All electrical power and hydraulic power (B and C systems) associated with the brake system must be off during rigging tension procedures Steps 4A(1) and 4A(2).

Reference is made in Steps 4A(1)(e), 4A(1)(f), and 4A(1)(g) to APPLIED cables and OFF cables. APPLIED cables are those which, when brakes are applied, carry the load from the brake input mechanism assembly to the dual power brake valve bellcranks. OFF cables are those which, when brakes are released, carry the load from the dual power brake valves to the brake input mechanism assembly.

Brake cables are identified by an abbreviated code which identifies them as to purpose, location, and usage, example: PBLA1. PB stands for power brake, L stands for left brake, A stands for APPLIED cable, and 1 stands for left side of the aircraft. Table 401 lists the brake system cable runs and the designated abbreviation.

CAUTION: DO NOT PULL ON TOP OF RUDDER PEDALS. BRAKE INPUT ROD IS DESIGNED FOR TENSION LOADS ONLY. PULLING ON TOP OF RUDDER PEDALS APPLIES COMPRESSION LOADS AND CAN DAMAGE INPUT ROD.

EFFECTIVITY: 001-014

32-43-00
CONFIG-1
Page 501
Jul 15/84

Brake Cable Identification
Table 401

CODE	CABLE
PBLA1	Left brake, APPLIED cable, left side of aircraft
PBLA2	Left brake, APPLIED cable, right side of aircraft
PBRA1	Right brake, APPLIED cable, left side of aircraft
PBRA2	Right brake, APPLIED cable, right side of aircraft
PBL01	Left brake, OFF cable, left side of aircraft
PBL02	Left brake, OFF cable, right side of aircraft
PBR01	Right brake, OFF cable, left side of aircraft
PBR02	Right brake, OFF cable, right side of aircraft

2. Equipment and Materials

Rig pins, 5/16-inch steel, 6-inches long (four required)

Cable tensiometer, 0 to 200 lb

R Shop aid, brake pedal adjustment (make locally per Fig. 503)

R Pressure gage, 0-4000 psi (two required)

Cotter Pin, MS24665-155, or equivalent

Lock-wire, QQ-W-390, 0.032-inch diameter, or equivalent

3. Referenced Procedures

24-00-00 Electrical Power - Maintenance Practices

27-21-00 Rudder Control System - Adjustment and Test

29-11-00 Hydraulic Power System - Maintenance Practices

4. Adjustment/Test

A. Adjustment

EFFECTIVITY: 001-014

LOCKHEED
MAINTENANCE MANUAL

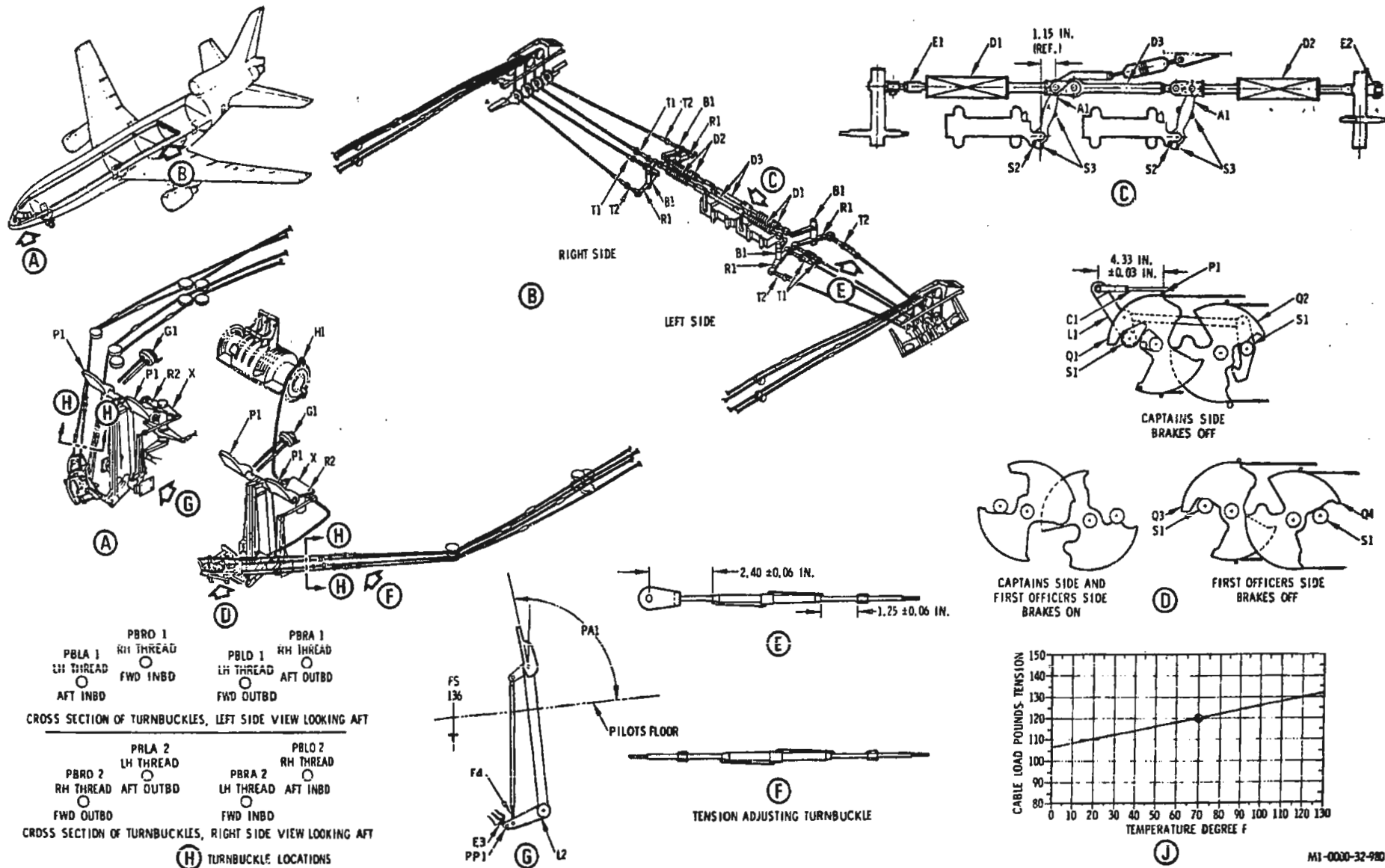
- R (1) Brake Control Mechanism, Cables and Linkage (Ref. Fig. 501)
R
- The following procedures rig the brake input system from the input quadrant to the dual power brake valves.
- (a) Before adjusting the brake control system turn off and tag hydraulic systems B and C (Ref. 29-11-00).
- (b) In hydraulic service center, zone 147, disconnect override spring assemblies D1 and D2, and interconnect rod D3 (View C).
- R (c) Install four rig pins R1 in bellcranks B1 (View B). For location, refer to Fig. 502.
- (d) Preset turnbuckles T1 and T2 (View B) as shown in View E.
- R (e) In forward electronic service center, zone 112, use tension adjusting turnbuckles (Views A and F) to apply increasing tension to all APPLIED cables PBLA1, PBRA1, PBLA2, and PBRA2 until input quadrants Q1, Q2, Q3, and Q4 (View D) are against off stops S1.
- R (f) Tighten APPLIED cable turnbuckles three turns, then OFF cable turnbuckles PBR01, PBL01, PBR02, and PBL02 three turns alternately until cable tension in all APPLIED cables is 120 lbs measured on a tensiometer. Do not adjust turnbuckles T1 and T2.
- R (g) Tighten all OFF cables until cable tension is 120 lbs.
- R (h) Readjust all cable tensions until all quadrants are against off stops and rig pins R1 can be easily removed. Do not adjust turnbuckles T1 and T2.
- (i) Reconnect override spring assemblies D1 and D2.
- R CAUTION: DO NOT ADJUST STOPS S3 ON VALVE ARM A1.
R STOPS S3 ARE ADJUSTED BY MANUFACTURER TO
R PROTECT VALVE SPOOL.
- R (j) Adjust rod ends E1 and E2 (View C) so that each dual power brake valve arm A1 is against off stops S2.
- R (k) Adjust and reconnect interconnect rod D3.

EFFECTIVITY: 001-014

32-43-00
CONFIG-1
Page 503
Aug 15/81



- (l) Remove rig pins R1.
- (m) Apply brake pedal pressure alternately to Captains and First Officers brake pedals and readjust cables as required to keep quadrants Q1, Q2, Q3, and Q4 against off stops S1 and allow installation of rig pins R1 in bellcranks B1. Check cable tension to ensure that it remains within tolerances shown in View J ± 5 percent.
- (n) Install two rig pins R1 in bellcranks B1 on right side only. Depress Captains brake pedals fully and observe that right override spring assemblies D2 work freely.
- (o) Remove rig pins R1 from bellcranks B1 and install in bellcranks B1 on left side. Depress First Officers brake pedals fully and observe that left override spring assemblies D1 work freely.
- (p) Remove rig pins R1 from bellcranks B1.
- (q) Safety interconnect rod D3 rod end and override spring D1 and D2 rod ends with cotter pins.
- (r) Safety interconnect rod D3 and override spring D1 and D2 adjustment lock nuts with 0.032 inch lock-wire.
- (2) Parking Brake Latching Mechanism (Ref. Fig. 501)
- (a) Ensure that PARK brake knob H1 (View A) is in the full off (in) position.
- (b) In forward electronic service center, zone 112, ensure that clamps securing control cable to structure are holding cable firmly enough to prevent cable from sliding through clamps.
- (c) Adjust end clevis C1 (View D) so pawl lever L1 clevis attach hole center is 4.33 (± 0.03) inches forward of quadrant Q1 top guard pin P1.
- (d) If clevis cannot be adjusted because it is too short or too long, loosen clamps and reposition cable so that clevis can be adjusted. Ensure that PARK knob H1 can be positioned to full off position.
- (e) Tighten clevis lock nut.



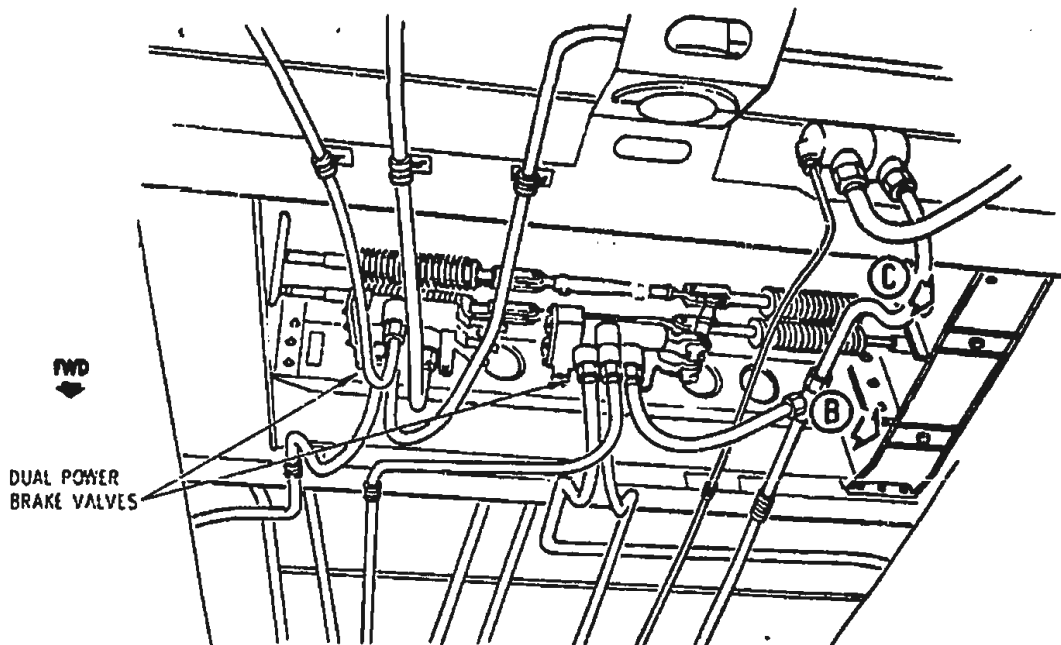
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Brake System Adjustment and Test
Figure 501

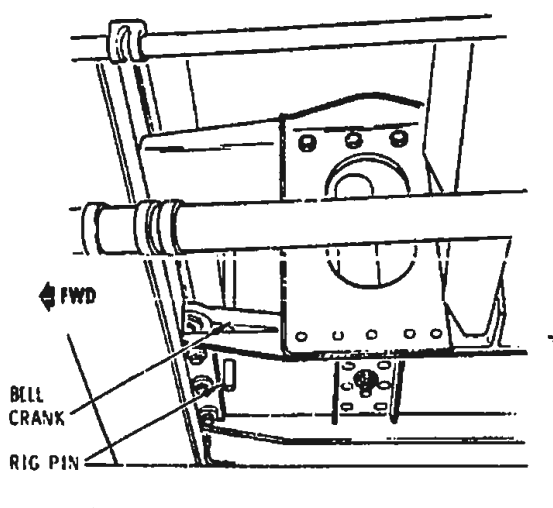
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32-43-00
CONFIG-1
Page 505/506
Aug 15/81

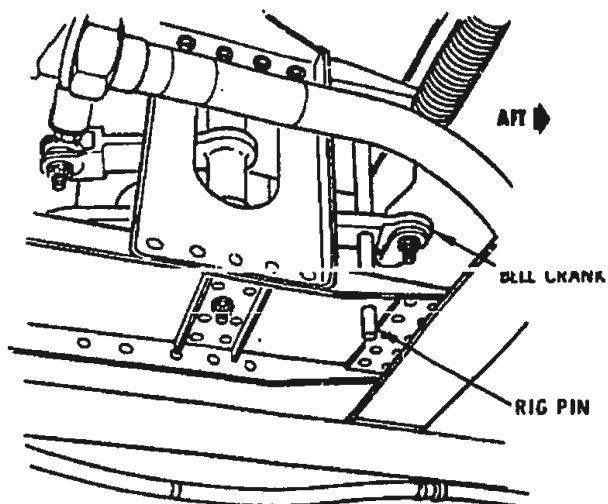
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MAINTENANCE MANUAL



(A)



(B)
RIGHT SIDE SHOWN
LEFT SIDE OPPOSITE



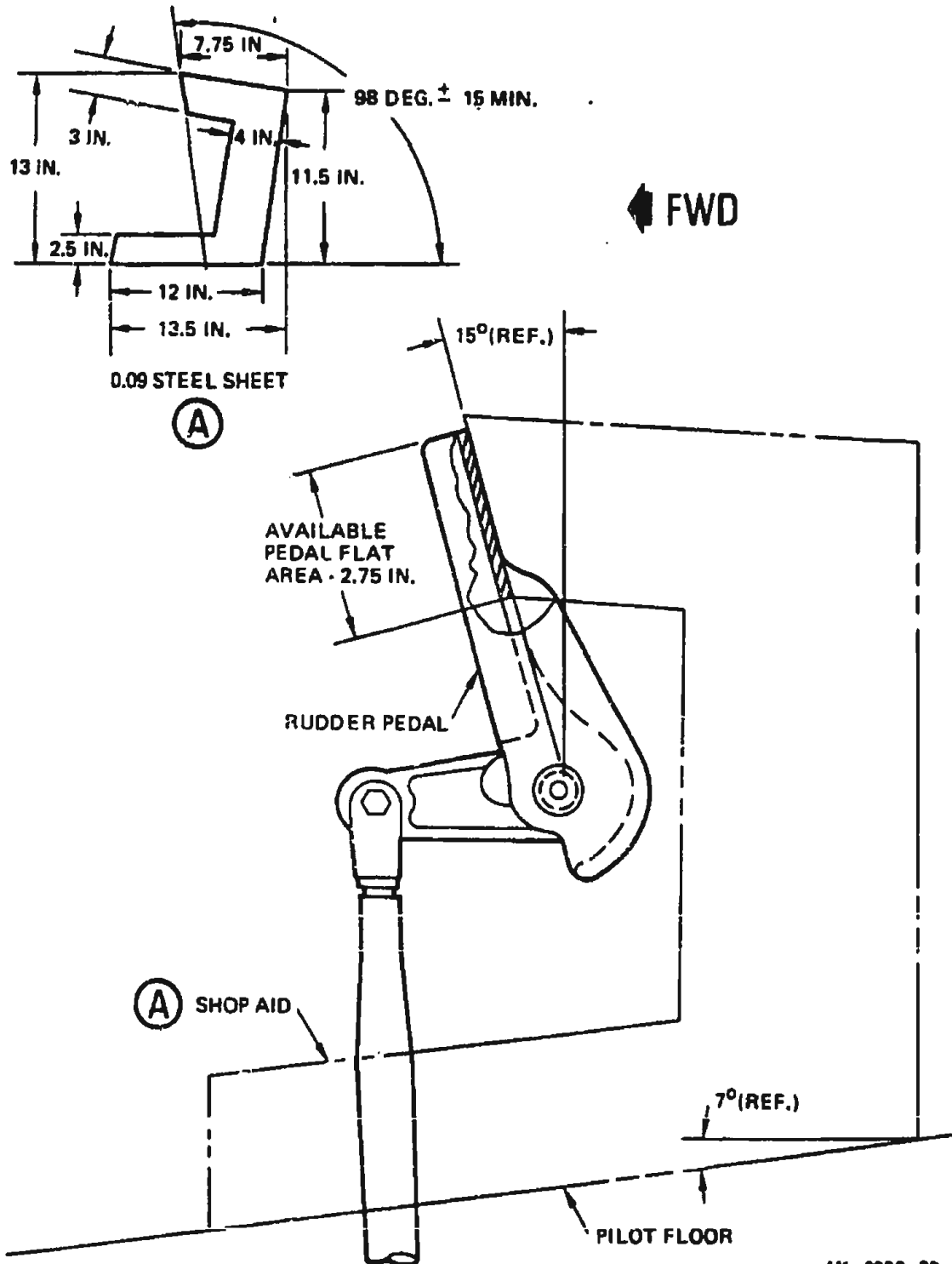
(C)
RIGHT SIDE SHOWN
LEFT SIDE OPPOSITE

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Aft Rig Pin Positioning
Figure 502

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MAINTENANCE MANUAL



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R
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Rudder Pedal Angle
Figure 503

EFFECTIVITY: 001-014

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32-43-00
CONFIG-1
Page 508
Aug 15/81



NOTE: Rig pin R1 is not used in the following procedures. Parking brake pressure adjustment may cause a condition which prevents insertion of rig pin R1 in bellcranks B1. This condition is normal and further bellcrank rigging is not required.

- R (3) Parking Brake Pressure (Ref. Fig. 501)
- (a) On left and right main landing gear, install pressure gages in brake assembly 2F and 3F bleed ports.
 - (b) Turn on electrical power (Ref. 24-00-00).
 - (c) Turn on hydraulic system B pressure (Ref. 29-11-00).
 - (d) On pilots center instrument panel, zone 210, place BRAKE SYS SELECT switch to NORM SYS B. Depress antiskid control monitor power switch to ON position.
 - (e) Depress Captains brake pedals P1 (View A) full on, pull PARK brake knob H1, and release pedals to set parking brake.
 - (f) Check that parking brake light, above PARK knob, is on.
 - (g) Check pressure gages installed on brake assembly bleed fittings to determine that brake hydraulic pressure is 1500 (± 200) psi at both gages, and that both gage indications are within 50 psi of each other.
 - (h) If brake hydraulic pressure is too high on a gage, tighten Captains (left side) turnbuckle T2 (View B) and loosen Captains (left side) turnbuckle T1 equal amounts until correct pressure is obtained.
- NOTE:** Right MLG brake gage and left MLG brake gage pressures must be within 50 psi of each other.
- (i) If brake hydraulic pressure is too low on a gage, loosen Captains (left side) turnbuckle T2 and tighten Captains (left side) turnbuckle T1 equal amounts until correct pressure is obtained.
 - (j) Release and reset parking brake.

EFFECTIVITY: 001-014

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MAINTENANCE MANUAL

- (k) Recheck brake pressure and readjust as required in accordance with Steps 4A(3)(h) and 4A(3)(i).
- (l) Release parking brake, BRAKE knob in, and recheck cable tension against chart (View J).
- (m) If cable tension is out of tolerance, tighten or loosen Captains (left side) T1 and T2 equally to obtain correct cable tension.
- (n) Repeat Steps 4A(3)(f) through 4A(3)(m) as required until cable tension and hydraulic pressure at gages remain within tolerance.
- (o) With parking brake set (on), check that parking brake lights are on. Release parking brakes and check that parking brake lights are off.
- (p) Depress antiskid control monitor power switch to OFF position.
- (q) Turn off electrical power (Ref. 24-00-00).
- (r) Turn off hydraulic pressure (Ref. 29-11-00).
- (s) Pump brake pedals until BRAKE ACCUM NORM HYD PRESS on Flight Engineer/Second Officers HYDRAULIC SYSTEM PANEL indicates 0 psi.
- (t) Disconnect MLG brake assembly hydraulic pressure gages and secure bleed fittings.

R (4) Rudder Pedal Angle (Ref. Fig. 501)

CAUTION: DO NOT PULL ON TOP OF RUDDER PEDALS. RUDDER PEDAL BRAKE INPUT ROD DESIGNED TO ACCEPT TENSION LOADS ONLY. PULLING ON TOP OF RUDDER PEDAL CAN DAMAGE BRAKE INPUT ROD.

- (a) Adjust rudder output pushrods and rudder pedal gearbox (Ref. 27-21-00).
- (b) Install two rig pins R2 (View A) in rudder pedal system X. Ensure that rudder pedal gearbox is adjusted to neutral position. For location, refer to Fig. 504.
- (c) Adjust rod end E3 (View G) on quadrant input strap to approximately mid position (0.190-inch of rod end thread showing).

EFFECTIVITY: 001-014

32-43-00

CONFIG-1
Page 510
Aug 15/81



MAINTENANCE MANUAL

- (d) Adjust rod end E4 (View G) to position rudder pedal angle PA1 at 98 degrees (± 2 degrees 30 minutes) from pilot floor. This may be accomplished by manufacturing a shop aid as described in Fig. 503. Readjust rod end E3 as required, if full adjustment cannot be attained by adjusting rod end E4.
- (e) Remove rig pins R2 from rudder pedal system X (View A).
- (f) Install control column dust cover.
- (g) Secure rod end lock nuts with 0.032 inch lock-wire.

B. Test

(1) Brake Control Mechanism

- (a) Turn off "B" and "C" system hydraulic pressure (Ref. 29-11-00).
- (b) Apply braking force on each rudder pedal, independently cycle each pedal at least 5 times, thru full travel range. Pedal action must be smooth with no evidence of excessive friction or interference in the pedal mechanism.
- (c) Repeat Step (b) except operate Captains Left and right pedals in unison.
- (d) Repeat Step (b) except operate First Officers left and right pedals in unison.
- (e) Turn on "B" system hydraulic pressure (Ref. 29-11-00).
- (f) Set and release parking brake using Captains rudder pedals, pedal action must be smooth with no evidence of friction or interference.

NOTE: Ensure that parking brake lights come on with brakes set.

Ensure that low brake pressure annunciator light is off.

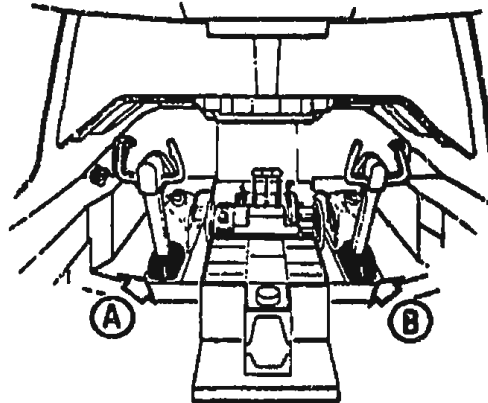
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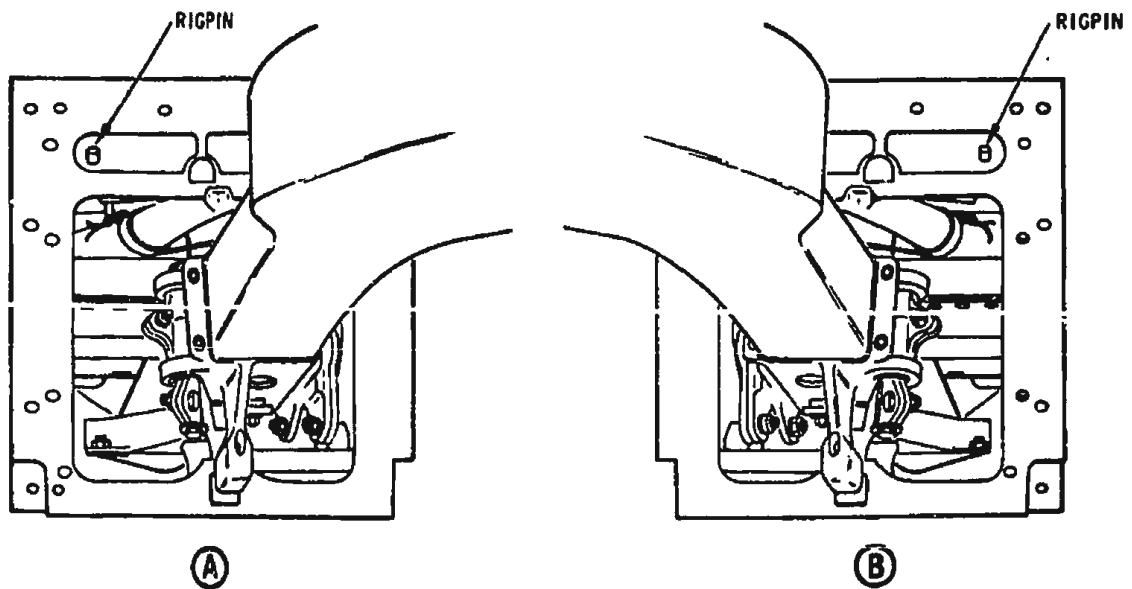
32-43-00
CONFIG-1
Page 511
Nov 15/88

001B

LOCKHEED
MAINTENANCE MANUAL



ZONE 210
FLIGHT STATION



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Forward Rig Pin Positioning
Figure 504

R EFFECTIVITY: 001-014
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001B

32-43-00
CONFIG-1
Page 512
Sep 15/80

MAIN LANDING GEAR BRAKE SYSTEM - ADJUSTMENT AND TEST**1. General**

The brake control system must be rigged after repair or replacement of linkage, cables, or replacement of dual power brake valves. Adjustments are made to the aft linkage until the dual power brake valves are in the off position. Cable tension is adjusted. Input linkage is adjusted to correctly angle the brake pedals.

Hydraulic pressure is checked at the brake assemblies. Brakes are checked for operation and response.

Parking brake linkage is checked and adjusted for lock-in of the parking brake mechanism and control.

The temperature of the aircraft and cables should be stabilized for a minimum of one hour prior to rigging of the brake control system. Air conditioning equipment should not be operated prior to, or during, rigging. The specified tension is based on a temperature of 70 degrees Fahrenheit. The temperature-tension compensation chart (Ref. Fig. 501 View J) must be referred to when rigging at other temperatures. Cable tension tolerance is ± 5 percent. All electrical power and hydraulic power (B and C systems) associated with the brake system must be off during rigging procedures, Steps 4A(1) and 4A(2).

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Reference is made in Steps 4A(1)(d), 4A(1)(e), and 4A(1)(f) to APPLIED cables and OFF cables. APPLIED cables are those which, when brakes are applied, carry the load from the brake input mechanism assembly to the dual power brake valve bellcranks. OFF cables are those which, when brakes are released, carry the load from the dual power brake valves to the brake input mechanism assembly.

Brake cables are identified by an abbreviated code which identifies them as to purpose, location, and usage, example: PBLA1. PB stands for power brake, L stands for left brake, A stands for APPLIED cable, and 1 stands for left side of the aircraft. Table 401 lists the brake system cable runs and the designated abbreviation.

CAUTION: DO NOT PULL ON TOP OF RUDDER PEDALS. BRAKE INPUT ROD IS DESIGNED FOR TENSION LOADS ONLY. PULLING ON TOP OF RUDDER PEDALS APPLIES COMPRESSION LOADS AND CAN DAMAGE INPUT ROD.

EFFECTIVITY: 015-999

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MAINTENANCE MANUAL

**Brake Cable Identification
Table 401**

CODE	CABLE
PBLA1	Left brake, APPLIED cable, left side of aircraft
PBLA2	Left brake, APPLIED cable, right side of aircraft
PBRA1	Right brake, APPLIED cable, left side of aircraft
PBRA2	Right brake, APPLIED cable, right side of aircraft
PBL01	Left brake, OFF cable, left side of aircraft
PBL02	Left brake, OFF cable, right side of aircraft
PBR01	Right brake, OFF cable, left side of aircraft
PBR02	Right brake, OFF cable, right side of aircraft

2. Equipment and Materials

Rig pins, 5/16-inch steel, 6-inches long (four required)

Cable tensiometer, 0 to 200 lb

Shop aid, brake pedal adjustment (make locally per Fig. 502)

Pressure gage, 0-4000 psi (two required)

Cotter Pin, MS24665-151, or equivalent

Cotter Pin, MS24665-155, or equivalent

R Lock-wire, QQ-W-390, 0.020-inch diameter, or equivalent

Lock-wire, QQ-W-390, 0.032-inch diameter, or equivalent

Lubricating Oil, MIL-L-6085, or equivalent

Lubricating Oil, MIL-L-7808, or equivalent

EFFECTIVITY: 015-999

002B

32-43-00
CONFIG-2
Page 502
May 15/85



3. Referenced Procedures

24-00-00	Electrical Power - Maintenance Practices
27-21-00	Rudder Control System - Adjustment and Test
29-11-00	Hydraulic Power System - Maintenance Practices

4. Adjustment/Test

A. Adjustment

- (1) Brake Control Mechanism, Cables and Linkage (Ref. Fig. 501)

The following procedures rig the brake input system from the input quadrant to the dual power brake valves.

- (a) Before adjusting the brake control system turn off and tag hydraulic systems B and C (Ref. 29-11-00).

- (b) In hydraulic service center, zone 147, disconnect override spring assemblies D1 and D2, and interconnect rod D3 (two places each) (Ref. Fig. 501 Sheet 1 View C).

- (c) Restrain rods D1, D2 and D3 so that full travel of the bellcrank B1 is not restricted.

- (d) Install four rig pins R1 in bellcranks B1 (Ref. Fig. 501 Sheet 1 View B). For location, refer to Fig. 503.

- (e) In hydraulic service center, zone 147, verify turnbuckles T1 and T2 (total 8 places) are preset in accordance with Figure 501 Sheet 1 View E.

- (f) In forward electronic service center, zone 112, use tension adjusting turnbuckles (Ref. Fig. 501 Sheet 1 View A) to apply increasing tension to all APPLIED cables PBLA1, PBRA1, PBLA2, and PBRA2 until input quadrants Q1, Q2, Q3, and Q4 (Ref. Fig. 501 Sheet 1 View D) are against off stops S1.

- (g) Tighten APPLIED cable turnbuckles three turns, then OFF cable turnbuckles PBR01, PBL01, PBR02, and PBL02 three turns alternately until cable tension in all APPLIED cables and all OFF cables is in accordance with cable tension chart, Figure 501 (Sheet 1) View J. Tolerance is ± 5 percent.

EFFECTIVITY: 015-999

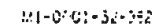
32-43-00
CONFIG-2
Page 503
Dec 15/94

LOCKHEED
MAINTENANCE MANUAL

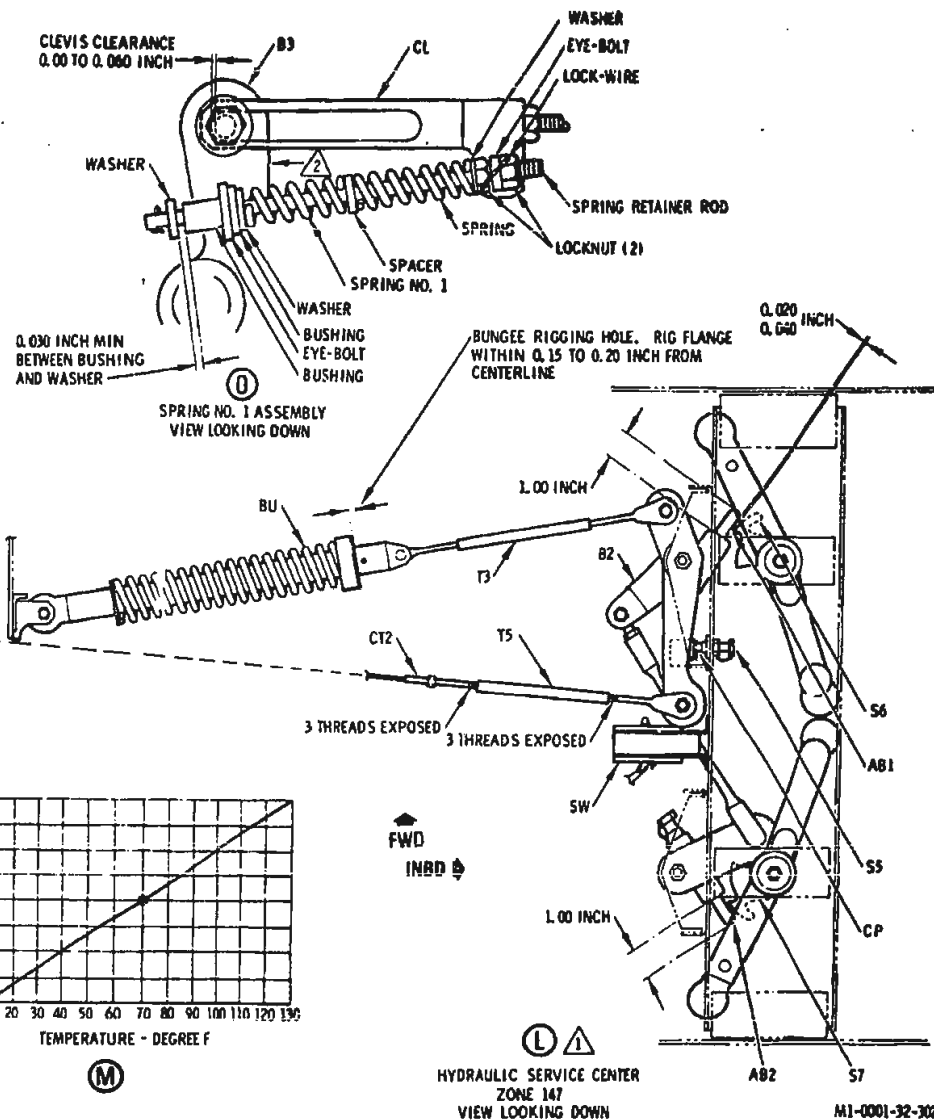
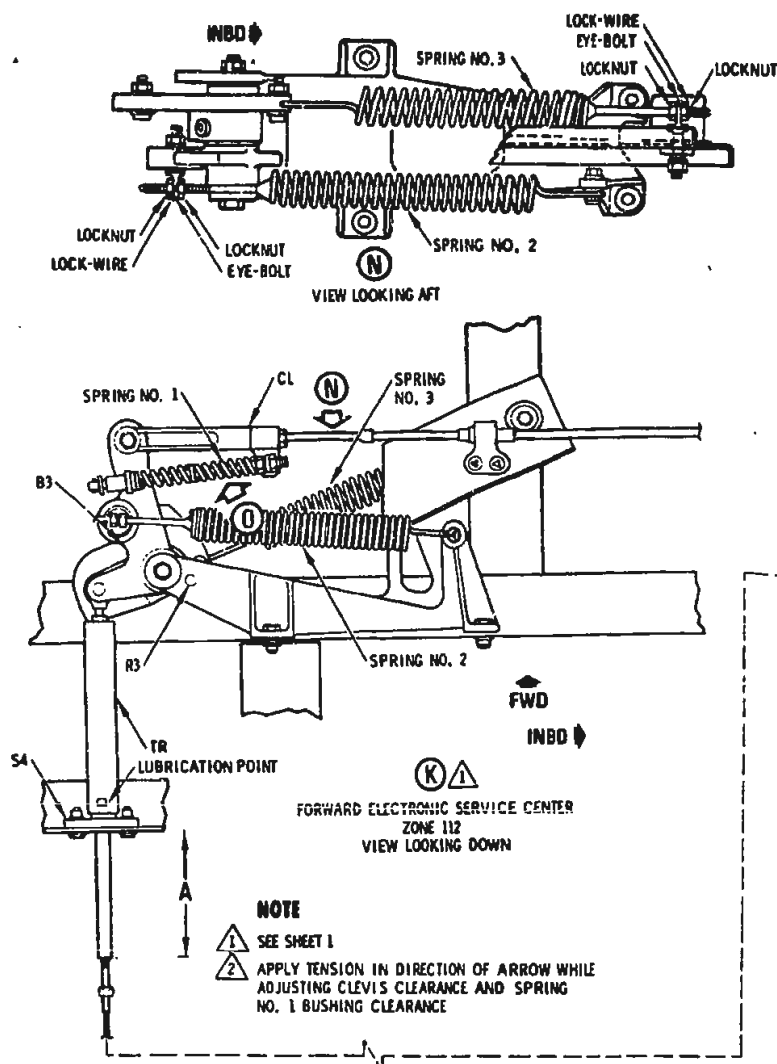
- R Measure tension with a tensiometer. Do not adjust
R turnbuckles T1 or T2.
- R (h) Readjust all cable tensions until all quadrants
R are against off stops and rig pins R1 can be
R easily removed. Do not adjust turnbuckles T1 or
R T2.
- R (i) Reconnect override spring assemblies D1 and D2.
- CAUTION: DO NOT ADJUST STOPS S3 ON VALVE ARM A1.
STOPS S3 ARE ADJUSTED BY MANUFACTURER TO
PROTECT VALVE SPOOL.
- R (j) Adjust rod ends E1 and E2 (Ref. Fig 501 Sheet 1
View C) so that each dual power brake valve arm A1
is against off stops S2.
- R (k) Adjust and reconnect interconnect rod D3.
- R (l) Remove rig pins R1.
- R (m) Apply brake pedal pressure alternately to Captains
and First Officers brake pedals and readjust
cables as required to keep quadrants Q1, Q2, Q3,
and Q4 against off stops S1 and allow installation
of rig pins R1 in bellcranks B1. Check cable
tension to ensure that it remains within tolerance
±5 percent shown in Figure 501 (Sheet 1) in View
J.
- CAUTION: NO MORE THAN THREE THREADS ARE TO BE EXPOSED
AT EACH END OF TURNBARREL.
- R (n) Install two rig pins R1 in bellcranks B1 on right
side only. Depress Captains brake pedals fully on
and observe that right override spring assemblies
D2 work freely.
- R (o) Remove rig pins R1 from bellcranks B1 and install
in bellcranks B1 on left side. Depress First
Officers brake pedals fully on and observe that
left override spring assemblies D1 work freely.
- R (p) Remove rig pins R1 from bellcranks B1.
- R (q) Safety interconnect rod D3 rod end and override
spring D1 and D2 rod ends with cotter pins.
- R (r) Safety interconnect rod D3 and override spring D1
and D2 adjustment lock nuts with 0.032 inch
lock-wire.

EFFECTIVITY: 015-999

32-43-00
CONFIG-2
Page 504
Dec 15/94



002B



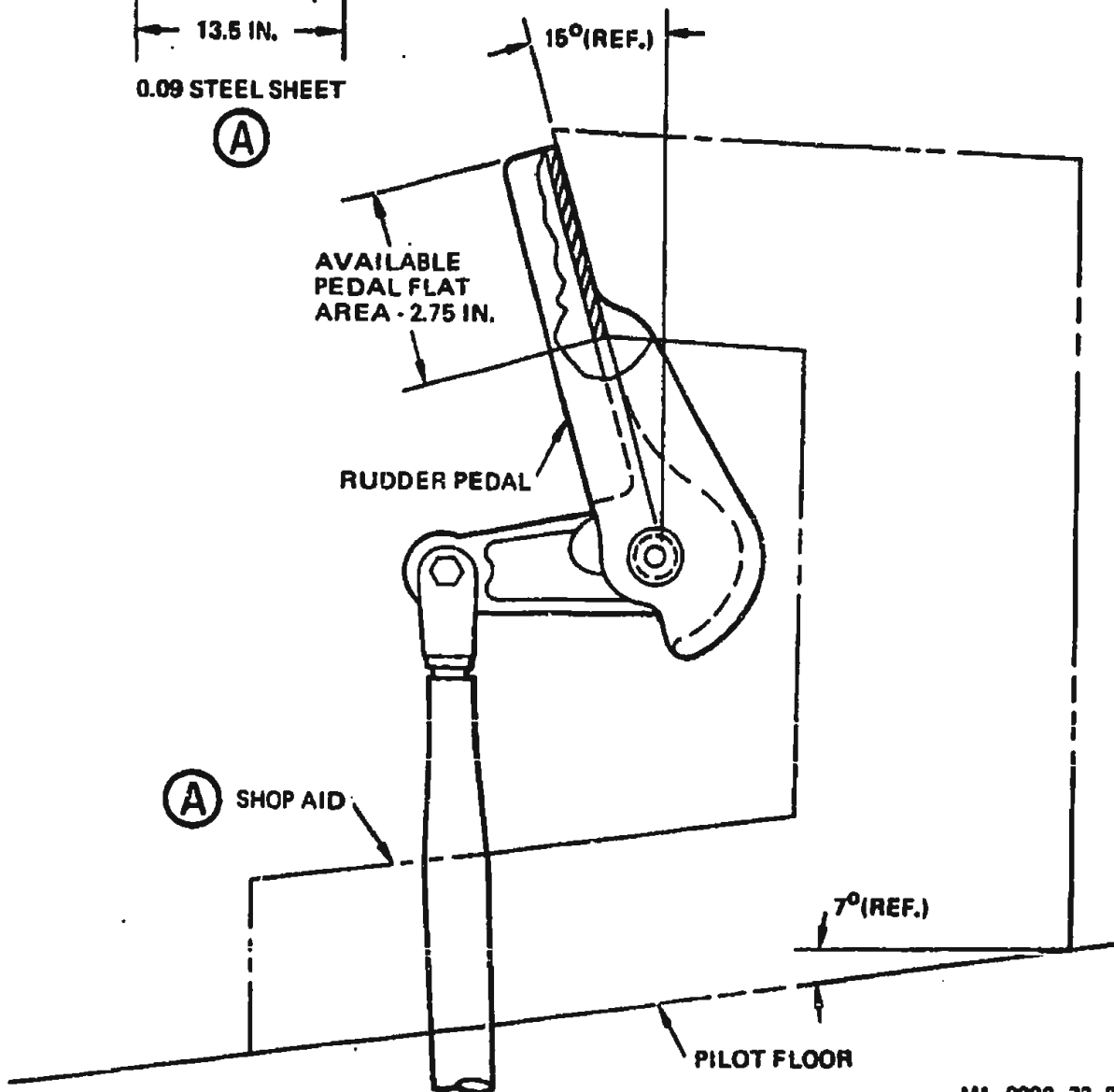
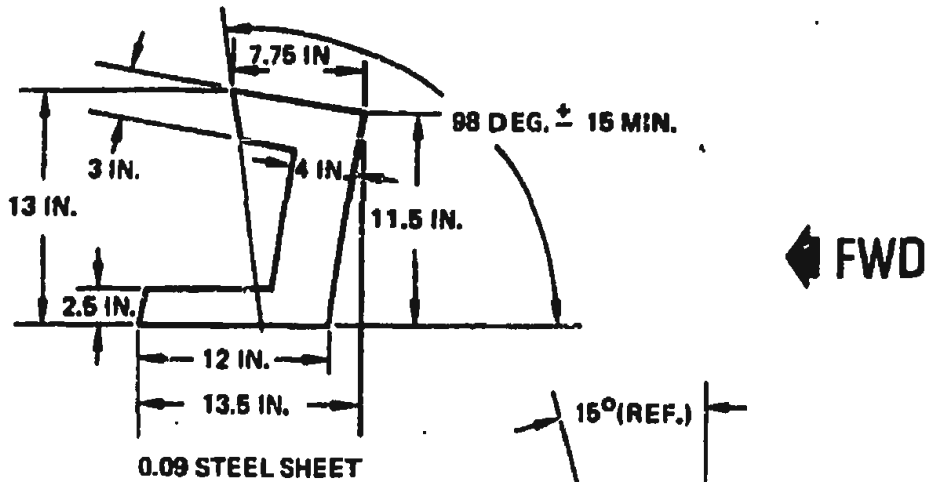
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Brake System Adjustment and Test
Figure 501 (Sheet 2)

EFFECTIVITY: 015-999

32-43-00
CONFIG-2
Page 507/508
Nov 15/88

LOCKHEED
MAINTENANCE MANUAL



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Rudder Pedal Angle
Figure 502

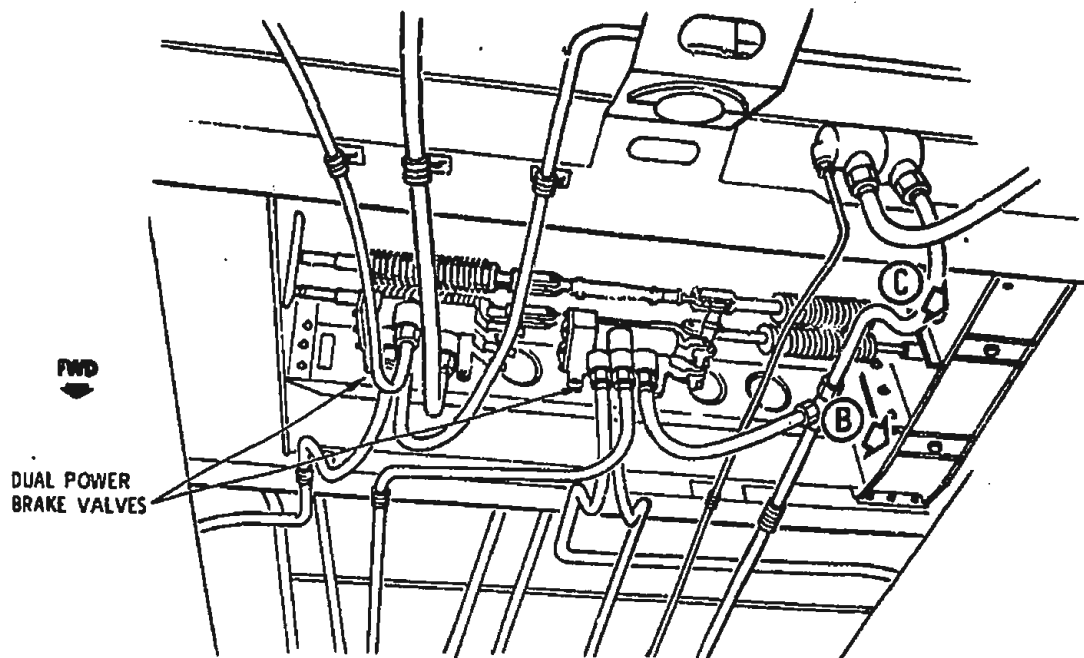
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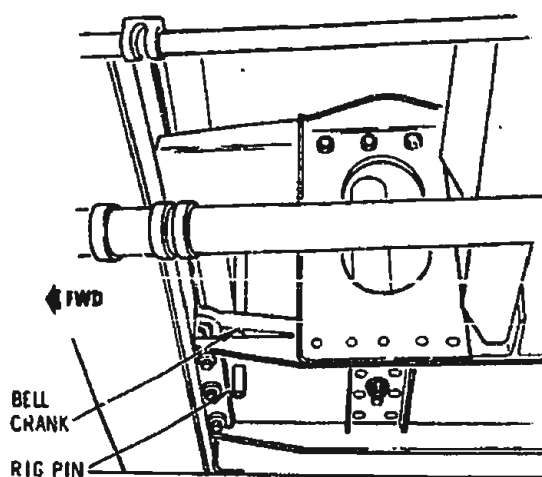
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32-43-00
CONFIG-2
Page 509
Jul 15/83

LOCKHEED
MAINTENANCE MANUAL

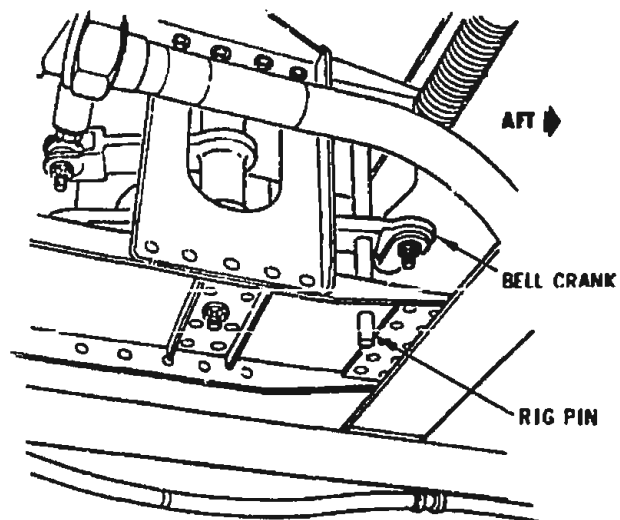


(A)



(B)

RIGHT SIDE SHOWN
LEFT SIDE OPPOSITE



(C)

RIGHT SIDE SHOWN
LEFT SIDE OPPOSITE

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Aft Rig Pin Positioning
Figure 503

R EFFECTIVITY: 015-999

002B

32-43-00

CONFIG-2
Page 510
Jul 15/83

LOCKHEED
MAINTENANCE MANUAL

R

- (s) Install locking clips on turnbuckles PBR01, PBL01, PBR02, and PBL02.

(2) Parking Brake Latching Mechanism (Ref. Fig. 501)

WARNING: DO NOT DISTURB TENSION OF SPRING NO. 2, OR SPRING NO. 3. THESE ARE SHOP ADJUSTMENTS ONLY.

- (a) Ensure that PARK brake knob H1 (Ref. Fig. 501 Sheet 1 View A) is in the full off (in) position.
- (b) In forward electronic service center, zone 112, ensure that clamps securing control cable to structure are holding cable firmly enough to prevent cable from sliding through clamps.
- (c) Install rig pin R3 (Ref. Fig. 501 Sheet 2 View K).

NOTE: The purpose of spring No. 1 is to maintain the PARK knob H1 (Ref. Fig. 501 Sheet 1 View A) in the parking brake on (pulled out) position. Therefore, it is necessary to apply tension to clevis CL (Ref. Fig. 501 Sheet 1 View O) in order to adjust clearance between the clevis slot and clevis attaching bolt, and the clearance between spring No. 1 bushing and washer (Ref. Fig. 501 Sheet 2 View O).

- (d) With PARK knob full off and tension applied to clevis CL, adjust clevis to provide 0.00 to 0.060-inch clearance between clevis slot and clevis attaching bolt.
- (e) With PARK knob full off and tension applied to clevis CL, adjust spring No. 1 to obtain a minimum clearance of 0.030 inch between bushing and washer.
- (f) Safety spring No. 1 and clevis CL with 0.020-inch lock-wire.

WARNING: DO NOT DISASSEMBLE TENSION REGULATOR (TR) WITHOUT PROPER SPRING RESTRAINING FIXTURES.

- (g) Adjust tension regulator TR length so that when regulator rod end is connected to bellcrank B3, opposite end of regulator is against stop S4. Verify that tension regulator is operating by pulling shaft away from stop, then releasing shaft so that opposite end returns to stop.

EFFECTIVITY: 015-999

32-43-00
CONFIG-2
Page 511
Dec 15/94



MAINTENANCE MANUAL

C
C
C
C
C
C

NOTE: If tension regulator is slipping, clean and exercise tension regulator using freon or chlorothene solvent (Ref. 20-90-02). Replace tension regulator if loose or worn allowing cable slack (Ref. Fig. 501 Sheet 2 View K).

- (h) Measure dimension A (Ref. Fig. 501 Sheet 2 View K). If dimension A is within tolerance of chart (Ref. Fig. 501 Sheet 2 View M), perform Step 4A(2)(i) and then proceed to Step 4A(2)(q).

NOTE: If dimension A is not within tolerance shown in chart (Ref. Fig. 501 Sheet 2 View M), the parking brake latching cable must be adjusted. When dimension A is less than tolerance, the cable tension is too low and must be increased by shortening the cable in accordance with Steps 4A(2)(i) and 4A(2)(j). When dimension A is greater than tolerance, the cable tension is too high and must be decreased by lengthening the cable in accordance with Step 4A(2)(i) and Steps 4A(2)(k) through 4A(2)(p).

- (i) Establish communications between forward electronic service center and hydraulic service center.
- (j) When dimension A is less than tolerance of chart (Ref. Fig. 501 Sheet 2 View M), use turnbuckle T5 to increase tension of latching cable until dimension A is within tolerance shown in chart.
- (k) When dimension A is greater than tolerance of chart, check number of threads exposed on turnbuckle T5.

CAUTION: WHEN ADJUSTING CABLE TENSION USING TURNBUCKLE T5, EXPOSED THREADS AT EACH BARREL END MUST NOT EXCEED THREE IN NUMBER.

- (l) If fewer than three threads at each end of barrel are exposed, used turnbuckle T5 to decrease tension of cable until dimension A is within tolerance shown in chart.
- (m) If three threads at each end of barrel are exposed prior to, or as a result of, performing Step 4A(2)(j), adjust dimension A in accordance with Steps 4A(2)(n) through 4A(2)(r).

R EFFECTIVITY: 015-999

R

002B

32-43-00
CONFIG-2
Page 512
Dec 15/94



MAINTENANCE MANUAL

- (n) Establish communications between forward electronic service center and forward cargo compartment.
 - (o) In forward cargo compartment, remove ceiling panel 125HB sufficiently to gain access to turnbuckle T4 (Ref. Fig. 501 Sheet 2 View F).
 - (p) Use turnbuckle T4 to decrease tension of latching cable until dimension A is within tolerance shown in chart (Ref. Fig. 501 Sheet 2 View M).
 - (q) Install locking clip on turnbuckle T4.
 - (r) Reinstall ceiling panel 125HB.
 - (s) Remove rig pin R3.
 - (t) In hydraulic service center, adjust bungee BU (Ref. Fig. 501 Sheet 2 View L) using turnbuckle T3 until bungee flange is clear of rigging hole so that distance from flange to rigging hole centerline is 0.15 to 0.20 inch (Ref. Fig. 501 Sheet 2 View L). Ensure that bellcrank B2 is against stop S5 at contact point CP.
 - (u) Ensure that clearance between adjusting bolts AB1 and AB2, and related rotating stops S6 and S7, is 0.020 to 0.040-inch. Adjust stop S5 as required.
 - (v) Ensure that adjusting bolts AB1 and AB2 protrude approximately 1.00 inch from housing (Ref. Fig. 501 Sheet 2 View L).
- (3) Parking Brake Pressure (Ref. Fig. 501).
- (a) On left and right main landing gear, install pressure gages in brake assembly 2F and 3F bleed ports.
 - (b) Turn on electrical power (Ref. 24-00-00).
 - (c) Turn on hydraulic system B pressure (Ref. 29-11-00).
 - (d) On pilots center instrument panel, zone 210, place BRAKE SYS SELECT switch to NORM SYS B. Depress antiskid control monitor power switch to ON position.
 - (e) Depress Captains brake pedals P1 (Ref. Fig. 501 Sheet 2 View A) full on and pull PARK brake knob

R EFFECTIVITY: 015-999

R

002B

32-43-00
CONFIG-2
Page 513
Dec 15/94



MAINTENANCE MANUAL

H1 until adjusting bolts AB1 and AB2 engage rotating stops S6 and S7. Release pedals, then release PARK brake knob H1. Parking brakes should be set.

- (f) Position switch SW (Ref. Fig. 501 Sheet 2 View L) so that contacts open but switch actuating arm is not bottomed out on switch case.
- (g) Adjust bolts AB1 and AB2 as required to obtain brake hydraulic pressure of 1500 (± 200) psi as indicated on pressure gages installed in Step (a). Readjust until both pressure gages are within 50 psi of each other.
- (h) Ensure that flight station parking brake indicator lights are on.
- (i) Push parking brake handle in and release. Ensure handle returns to out position.
- (j) Release parking brake. Ensure parking brake indicator lights go off and adjusting bolts AB1 and AB2 are fully disengaged.

Parking brake indicator lights must go off.

- (k) Depress antiskid control monitor power switch to OFF position.
 - (l) Turn off electrical power (Ref. 24-00-00).
 - (m) Turn off hydraulic pressure (Ref. 29-11-00).
 - (n) Pump brake pedals until BRAKE ACCUM NORM HYD PRESS on Flight Engineer/Second Officers HYDRAULIC SYSTEM PANEL indicates 0 psi.
 - (o) Disconnect MLG brake assembly hydraulic pressure gages and secure bleed fittings.
- (4) Rudder Pedal Angle (Ref. Fig. 501)

CAUTION: DO NOT PULL ON TOP OF RUDDER PEDALS. BRAKE INPUT ROD IS DESIGNED FOR TENSION LOADS ONLY. PULLING ON TOP OF RUDDER PEDALS APPLIES COMPRESSION LOADS AND CAN DAMAGE INPUT ROD.

- (a) Adjust rudder output pushrods and rudder pedal gearbox (Ref. 27-21-00).



MAINTENANCE MANUAL

- (b) Install two rig pins R2 (Ref. Fig. 501 Sheet 1 View A) in rudder pedal system X. Ensure that rudder pedal gearbox is adjusted to neutral position. For location refer to Fig. 504.
- (c) Adjust rod end E3 (Ref. Fig. 501 Sheet 1 View G) on quadrant input strap to approximately mid position (0.190-inch of rod end thread showing).
- (d) Adjust rod end E4 (Ref. Fig. 501 Sheet 1 View G) to position rudder pedal angle PA1 at 98 degrees (± 2 degrees 30 minutes) from pilot floor. This may be accomplished by manufacturing a shop aid as described in Fig. 502. Readjust rod end E3 as required, if full adjustment cannot be attained by adjusting rod end E4.
- (e) Remove rig pins R2 from rudder pedal system X (Ref. Fig. 501 Sheet 1 View A).
- (f) Install control column dust cover.
- (g) Secure rod end lock nuts with 0.032 inch lock-wire.

B. Test

(1) Brake Control Mechanism

- (a) Turn off "B" and "C" system hydraulic pressure (Ref. 29-11-00).
- (b) Apply braking force on each rudder pedal, independently cycling each pedal at least 5 times, thru full travel range. Pedal action must be smooth with no evidence of excessive friction or interference in the pedal mechanism.
- (c) Repeat Step (b) except operate Captains left and right pedals in unison.
- (d) Repeat Step (b) except operate First Officers left and right pedals in unison.
- (e) Turn on "B" system hydraulic pressure (Ref. 29-11-00).
- (f) Set and release parking brake using Captains rudder pedals. Pedal action must be smooth with no evidence of friction or interference.

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R

EFFECTIVITY: 015-999

002B

32-43-00
CONFIG-2
Page 515
Dec 15/94

LOCKHEED



MAINTENANCE MANUAL

NOTE: Ensure that parking brake lights come on with brakes set.

Ensure that low brake pressure annunciator light is off.

- (g) Repeat Step (f) except operate First Officers rudder pedals.

R EFFECTIVITY: 015-999

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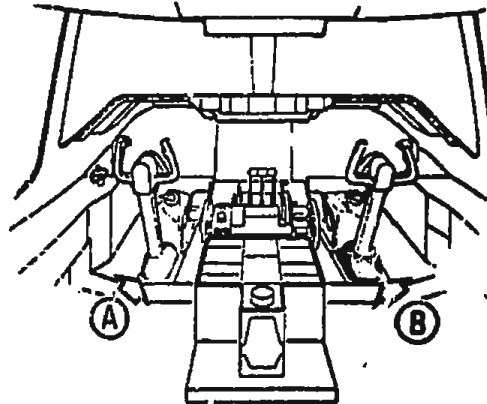
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CONFIG-2

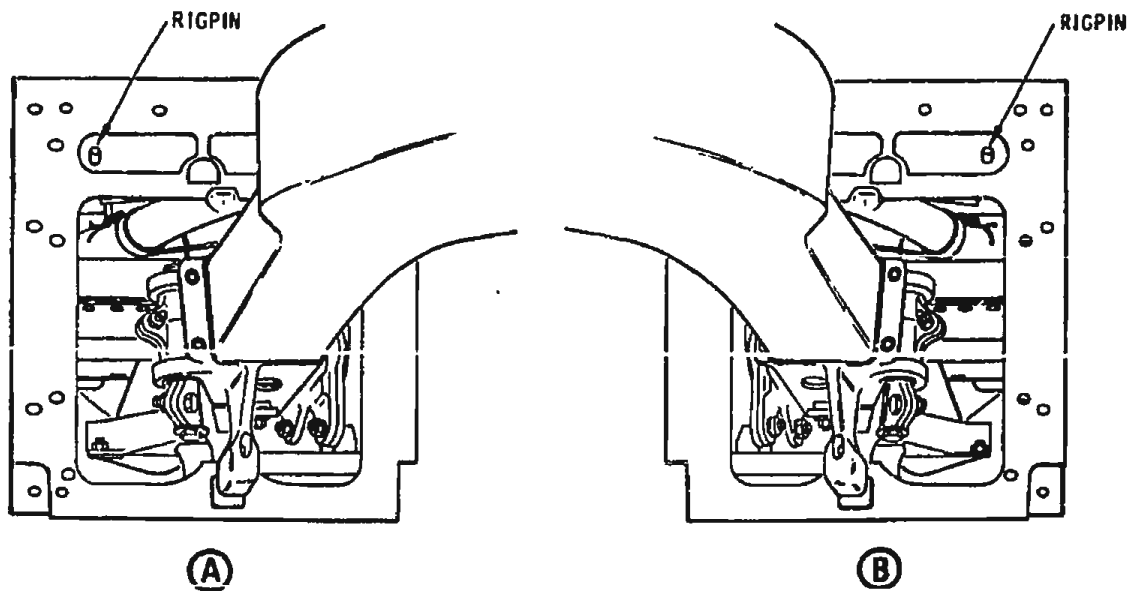
Page 516

Dec 15/94

LOCKHEED
MAINTENANCE MANUAL



ZONE 210
FLIGHT STATION



HH 8697
M1-0101-32-209

Forward Rig Pin Positioning
Figure 504

R EFFECTIVITY: 015-999
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32-43-00
CONFIG-2
Page 517/518
Dec 15/94

MAIN LANDING GEAR BRAKE SYSTEM - INSPECTION AND CHECK1. General

This inspection and check procedure covers those components of the hydraulic brake system which are located in the landing gear strut area, zone 730, and which can be inspected visually without removal of these or other components.

2. Referenced Procedure

32-33-00 Main Landing Gear Inboard Door - Maintenance Practices

3. Inspection/Check

A. Inspection

- (1) Open main landing gear (MLG) inboard doors and install inboard door actuator locks (Ref. 32-33-00).
- (2) Inspect all brake flex lines for chafing, impact damage, and deterioration.
- (3) Inspect all rigid brake lines for cracks, dents, and chafing.
- (4) Check all connectors for evidence of leaks.
- (5) Inspect all brake line clamps for security.
- (6) At brake assembly (Ref. Fig. 601):
 - (a) Inspect brake torque links for wear, cracks, and impact damage.
 - (b) Inspect zero leak brake disconnect couplings for loose bolts and broken or missing lock-wire. Check couplings for evidence of leaks.
 - (c) Verify identification plate WORN BRAKE RTD COMPLIANCE B.F.G. S.B. 561 & 562 is installed next to brake wear indicator pin bracket. If plate is not installed, verify aircraft complies with SB32-253.
 - (d) Apply and hold brake pressure. Verify end of brake wear indicator pin is not less than flush

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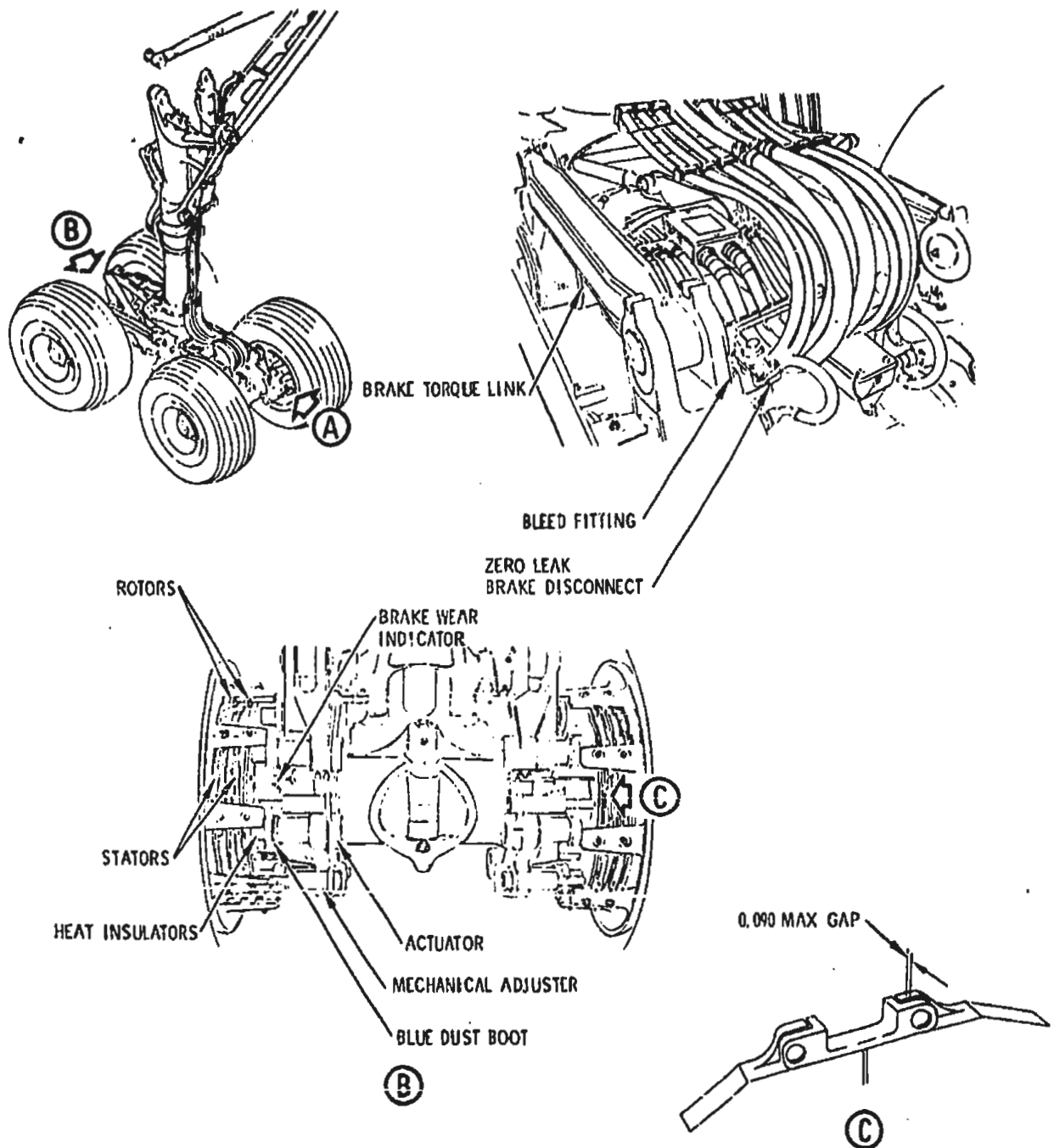
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EFFECTIVITY: ALL

32-43-00
Page 601
Dec 15/92

001B

LOCKHEED
MAINTENANCE MANUAL



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Main Landing Gear Brake System Inspection
Figure 601

EFFECTIVITY: ALL

001B

32-43-00
Page 602
May 15/82



MAINTENANCE MANUAL

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with end of grommet (Ref. Fig. 602). Replace brake if wear pin is flush with or recessed into grommet.

CR

NOTE: AD 91-23-12 applies.

NOTE: When brake is rebuilt, the wear pin must be set in strict accordance with applicable wear settings specified in B.F. Goodrich Overhaul Manual 32-43-03.

It is recommended that aircraft are scheduled for brake replacement when wear pin approaches grommet.

- (e) Inspect mechanical adjusters for impact damage and security.
- (f) Inspect actuators for impact damage, blue dust boots for damage, and heat insulators for broken segments and separation.

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NOTE: Dust Boot damage alone is not a requirement for a brake change.

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If cracks are found at the exposed piston end and the crack is not opening up, the brake should be set up for removal by MCIMC at a time that will not cause delay.

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C

If the cracks are spreading open and the insulator is being pushed down into the piston, which results in a decreased piston/insulator length, the brake must be removed immediately.

- (g) Inspect rotors for excessive wear, warping, and broken segments.

NOTE: Rotor rivet joint elongation is determined by inspecting No. 1 rotor (closest to piston housing). The maximum allowable gap between disk segment and rotor assembly link is 0.090 inch. If gap exceeds this maximum gap, the brake assembly must be set up for removal on the first overnight. (Ref. Fig. 601, View C).

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- (h) Inspect stators for excessive wear of lining pads (segments), missing or broken linings, and plate warping.

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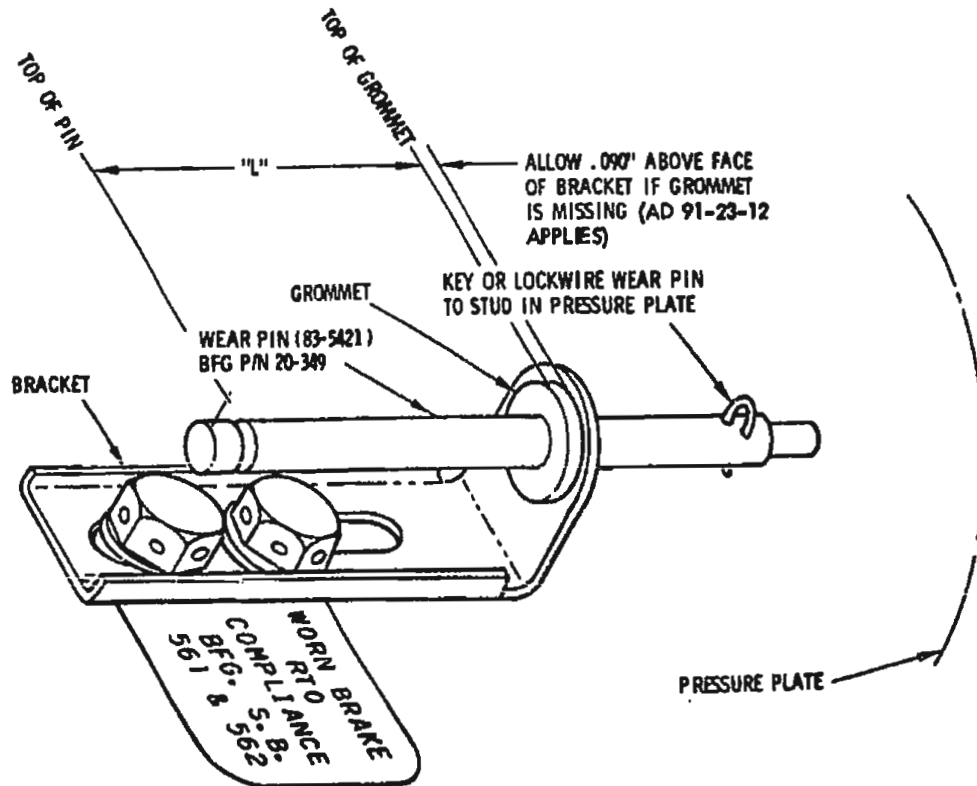
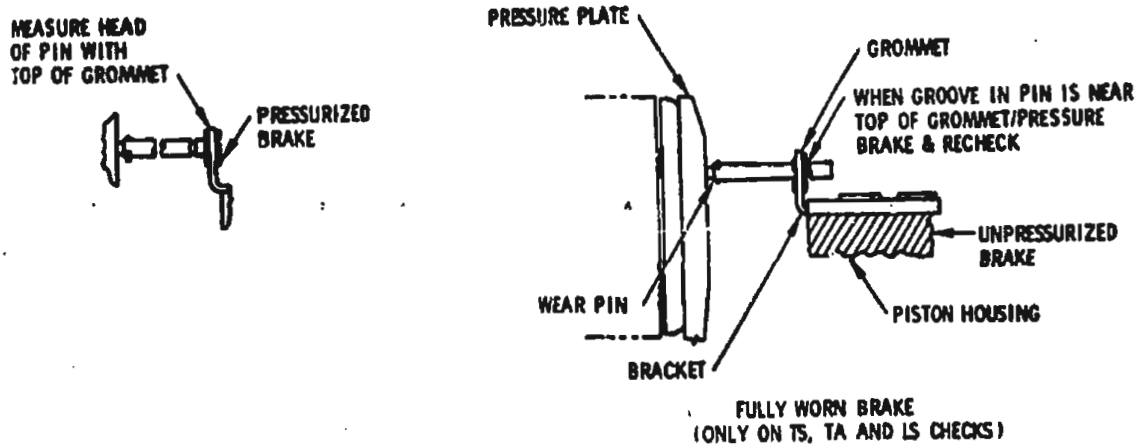
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32-43-00

Page 603

Jun 15/93

LOCKHEED
MAINTENANCE MANUAL



DIMENSION "L" IS ONLY VALID WITH BRAKES APPLIED

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**Brake Wear Indicator Dimensions
Figure 602**

EFFECTIVITY: ALL

001B

32-43-00
Page 604
Dec 15/93



- (i) Check bleed fitting for evidence of leaks.

NOTE: B. F. Goodrich Engineering has approved operation of the L-1011 brake with one (1) automatic adjuster either inoperative (missing). Six (6) automatic adjusters are located in the brake hydraulic piston housing. The brake may also be operated for a maximum of ten (10) landings with two (2) adjusters inoperative (missing) provided upon release of brakes the brake pressure plate retracts sufficiently (does not hang-up in one location to cause dragging brakes).

- (j) Close MLG inboard doors (Ref. 32-33-00).

EFFECTIVITY: ALL

32-43-00
Page 605
Jun 15/93

001B

LOCKHEED
MAINTENANCE MANUAL

B. Brake Removal Limits for Both Domestic & International Aircraft

NOTE: An identification plate (yellow placard) installed at the wear pin bracket indicates that brake has been modified in accordance with FAA Maintenance Inspection Program.

(1) Dimension "L" (top of wear pin to the grommet) is only valid with brakes applied (pressure on).

(2) The following limits are approved for modified brakes which are identified by a yellow placard on the wear indicator bracket:

(a) A L-1011 brake can be operated until the wear pin dimension "L" measures flush (full wear) on Through Services (TS), Turn-around (TA), and Periodic Service (PS) checks (Ref. Fig. 602).

(b) Brakes must be removed at Aircraft Service (AS), Station Service (SS), Time Control Service (TCS), and Check "C" checks if the indicator wear pin dimension "L" measures 1/16 inch or less with brakes applied (Ref. Fig. 602).

(c) Brakes must be removed at base overhaul if the indicator wear pin dimension "L" measures 1/8 inch or less with brakes applied (Ref. Fig. 602).

(3) Two brake wear indicator pins exist on each L-1011 main landing gear brake. One wear indicator pin can be missing, or damaged on each brake if the lone remaining pin can still be used for a measurement check. A replacement wear pin can be inserted thru the grommet in the bracket and lockwired to the stud in the pressure plate. If one wear pin shows that the brake has wear remaining while the other pin indicates no wear left, always honor the pin showing that no wear remains.

EFFECTIVITY: ALL

32-43-00
Page 606
Jun 15/93

001B

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR BRAKE - MAINTENANCE PRACTICES

1. General

- R A. One Brake Adjuster Assembly on each brake assembly may be
R inoperative provided it is verified that the pressure plate
R retracts sufficiently to prevent dragging brakes.
- R B. Two Brake Adjuster Assemblies on each brake assembly may be
R inoperative with the following provisions:
- R (1) The Brake Adjuster Assemblies are not installed
R adjacent to one another and
- R (2) It is verified that the pressure plate retracts
R sufficiently to prevent dragging brakes.

R 2. Referenced Procedures

- R 24-41-00 External Power/Ground Service System - Maintenance
R Practices
- R 29-11-00 Hydraulic Power System - Maintenance Practices

EFFECTIVITY: ALL

001B

32-43-01
Page 201
May 15/85

LOCKHEED
MAINTENANCE MANUAL

R 3. Procedures

R A. General

R The retraction verification procedure in Step B is a check
R to ensure that the pressure plate retracts and prevents
R dragging brakes. Note that in Step 1B(1), this verification
R test is valid for two inoperative Brake Adjuster Assemblies
R provided the two assemblies are not adjacent to one another.

R B. Brake Assembly Pressure Plate Retraction Verification

R **WARNING:** VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY
R HYDRAULIC SYSTEM:

R LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY
R DEVICES ARE INSTALLED.

R PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL
R FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL
R AREAS.

R THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT
R HYDRAULIC PRESSURE.

- R (1) Turn on hydraulic system B pressure (Ref. 29-11-00)
R while observing brake disc. Brake disc assembly must
R not actuate (compress).
- R (2) Verify that electrical power is on (Ref. 24-41-00).
- R (3) On Flight Engineer/Second Officers overhead circuit
R breaker panel CB2, verify that circuit breakers PARKING
R BRAKE NO. 1 (G18) and PARKING BRAKE NO. 2 (G22) are
R closed.
- R (4) On pilots center instrument panel, zone 210, place
R BRAKE SYS SELECT switch to NORM SYS B position.
- R (5) Depress brake pedals and release.
- R (6) Verify that brake disc assembly returns to relaxed
R position.
- R (7) Turn off hydraulic system B pressure (Ref. 29-11-00).
- R (8) Turn on hydraulic system C pressure (Ref. 29-11-00)
R while observing brake discs. Brake disc assembly must
R not actuate (compress).
- R (9) Place BRAKE SYS SELECT switch to ALT SYS C position.

EFFECTIVITY: ALL

001B

32-43-01
Page 202
May 15/85

LOCKHEED
MAINTENANCE MANUAL

- R (10) Depress brake pedals and release.
- R (11) Verify that brake disc assembly return to relaxed
R position.
- R (12) Turn off electrical power, as applicable (Ref.
R 24-41-00).
- R (13) Turn off hydraulic power as applicable (Ref. 24-41-00).
- R (14) Install placard on the FE/SO panel, ONE (or TWO) BRAKE
R ADJUSTER ASSEMBLY INOPERATIVE ON BRAKE(S) NO.
- R (15) Make appropriate entries in the aircraft log book.

R EFFECTIVITY: ALL
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001B

32-43-01
Page 203/204
May 15/85

**MAIN LANDING GEAR BRAKE - REMOVAL AND INSTALLATION****1. Equipment and Materials**

Axle Jack

Brake Handling/Alignment Fixture, PN 179-215, B. F. Goodrich Co., or equivalent

Cotter Pin, MS24665-153, or equivalent

Lock-wire, QQ-W-390, 0.020-inch diameter, or equivalent

Grease, Aeroshell 5, or equivalent

Wheel and Brake Change Tool Kit, PN B717, or equivalent

MLG Axle (Brake) Protector, PN BA89

MLG Axle Protector, PN BA41

MLG Sensor Protective Cap, PN BA31

Wheel/Tire and Brake Change Dolly, PN STC11471-1, Spec Tool Co., or equivalent

2. Referenced Procedures

- | | | |
|---|----------|--|
| R | 12-24-01 | Main Landing Gear - Servicing |
| | 32-11-04 | Main Landing Gear Axle - Removal and Installation |
| | 32-11-04 | Main Landing Gear Axle - Inspection and Check |
| | 32-41-01 | Main Landing Gear Wheel and Tire Assembly - Removal and Installation |
| | 32-43-00 | Main Landing Gear Brake System - Maintenance Practices |

C 3. Requirements

- | | | |
|---|----|---|
| C | A. | On the main gear brakes the first two rotating discs (wheel |
| C | | removal not required to detect) have had attaching links |
| C | | which loosen and elongate the rivet. As looseness occurs, |
| C | | the gap looking down between the link and rotor segment |
| C | | increases. When this gap (Reference Figure 402) reaches a |

EFFECTIVITY: ALL

32-43-01
Page 401
Dec 15/93



- C
C feeler gage width of .090 inch (approx. 3/32"), then the
brake must be set-up for removal on the first overnight.

4. Removal/Installation

A. Removal

- (1) Remove wheel and tire assembly (Ref. 32-41-01).
- C (2) Remove nut, bolt, and flange washers, and remove brake
torque link from brake.
- (3) Secure brake torque link in a raised position to clear
brake assembly.

CAUTION: ENSURE THAT HYDRAULIC SYSTEMS B AND C ARE OFF AND
THAT BRAKE PRESSURE HAS BEEN RELEASED BY PUMPING
THE BRAKE PEDALS UNTIL BOTH NORMAL AND ALTERNATE
BRAKE PRESSURE INDICATORS READ LESS THAN 100 PSI
(HYDRAULIC SYSTEM MAXIMUM RESIDUAL PRESSURE).

- (4) Remove bolts from hydraulic brake manifold coupling and
rotate coupling 10 degrees toward truck beam to
disconnect brake line from brake assembly. Secure a
suitable cover on brake assembly and manifold to
prevent contamination by dirt or liquid.
- (5) Disconnect brake temperature electrical lead at
connector.
- (6) Rig brake handling/alignment fixture to brake.
- (7) Position dolly and attach fixture to dolly (Ref. Fig.
401).

CAUTION: DO NOT IMPOSE SIDE LOADS BETWEEN AXLE AND BRAKE
ASSEMBLY.

- (8) Install MLG axle protector, axle (brake) protector and
sensor protective cap to protect axle brake bearing
surfaces (Ref. Fig. 401).
- (9) Move brake assembly out about 1 inch, then return brake
assembly to installed position.

NOTE: Wheel inner spacer and seal can then be removed.

- (10) Remove spacer and seal, and then slide brake assembly
from axle by moving dolly.

- C (11) Inspect axle (Ref. 32-11-04).

R EFFECTIVITY: ALL

001B



MAINTENANCE MANUAL

- (12) Visually inspect all axle chrome plated brake journal lands (two on each side of truck beam) for possible cracks and bronze transfer from the bushing to the axle chrome plated surface. Pay special attention to lower forward quarter of journals.
- (13) If bronze transfer is observed it must be removed by hand with 280 grit or finer sandpaper, then visually check chrome plated lands for crack damage. Cracks if they occur will most likely be curved semi circular near the edge of a heavy bronze transfer spot. Use a 10X minimum magnifying glass to check for cracks.
- (14) If crack is found, replace axle (Ref. 32-11-04).

B. Installation

- (1) Rig brake handling/alignment fixture to dolly (Ref. Fig. 401).

CAUTION: ENSURE THAT THE APPLICABLE BRAKE ASSEMBLY IS INSTALLED. FAILURE TO DO SO COULD RESULT IN BRAKE DAMAGE.

- (2) Attach replacement brake assembly to fixture.
- (3) Ensure that MLG axle protector, axle (brake) protector and sensor protective cap are installed.
- (4) Apply Aeroshell 5 grease, or equivalent, to the brake assembly axle mating surfaces.
- (5) Inspect brake assembly grease seal; replace seal as required.
- (6) Slide brake assembly on axle by moving dolly.
- (a) When changing a main wheel assembly or a main landing gear brake assembly, assure that axle inner-spacer and seal are installed properly prior to installing inner bearing, wheel, outer bearing, outer seal, outer spacer, axle nut and hub cap.

CAUTION: IF AXLE INNER-SPACER AND SEAL ARE LEFT OUT, WHEEL WILL BE LOOSE AND INNER BEARING CAN MOVE TOWARD BRAKE ASSEMBLY, CAUSING SEVERE DAMAGE. THE HEAVIER FACE OF BEARING SPACER MUST BE FACING AWAY FROM WHEEL.

- (7) Install wheel inner spacer and seal.

R EFFECTIVITY: ALL

001B

32-43-01
Page 403
Nov 15/89

LOCKHEED
MAINTENANCE MANUAL

- (8) Connect brake torque link to brake assembly. Install pin and flange washers.

CAUTION: PRIOR TO INSTALLATION OF NUT ON BRAKE TORQUE LINK PIN THROUGH-BOLT, VERIFY THAT NUT IS NOT A FIBER INSERT NUT (NUTS WITH FIBER SELF LOCKING FEATURE MUST BE REPLACED). NUT P/N RMTE 9868-6 IS THE PREFERRED SPARE. (TWA Stk. No. 70-0282)

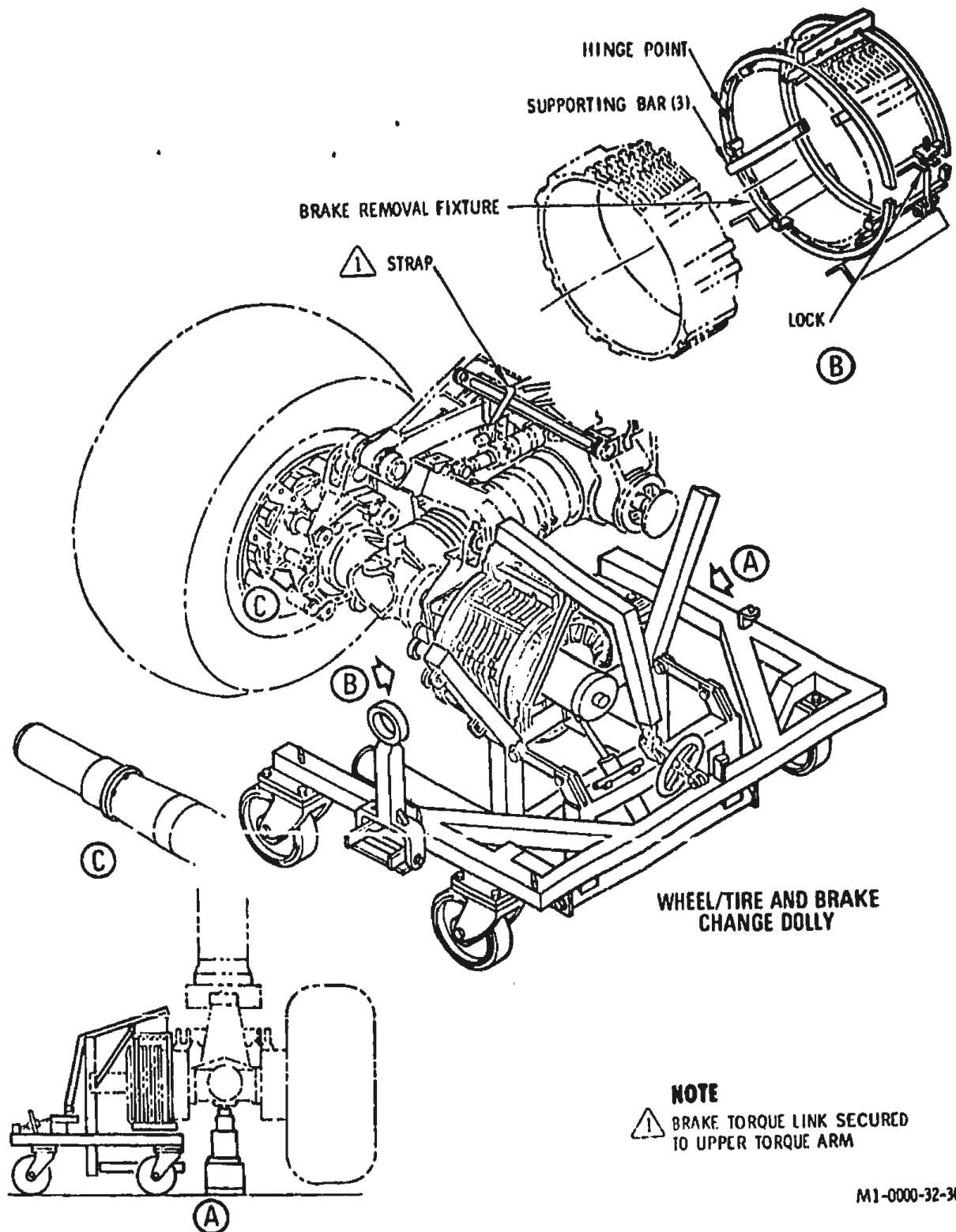
- (9) Install bolt and nut. Tighten nut until all end-play is removed. Loosen nut to first position of alignment and install cotter pin.
- (10) Connect hydraulic manifold coupling. Rotate manifold 10 degrees away from truck beam to engage. Install bolts and secure with lock-wire.
- (11) Connect brake temperature electrical lead.
- (12) Lubricate brake assembly-to-axle bearings through lubrication fittings on actuator housing with Aeroshell 5 grease, or equivalent.
- (13) Remove axle protective equipment.
- (14) Install wheel and tire assembly (Ref. 32-41-01).
- (15) Lubricate torque link bearings through lubrication fittings with grease (Ref. 12-24-01).
- (16) Bleed brake at brake bleed fitting (Ref. 32-43-00).

EFFECTIVITY: ALL

32-43-01
Page 404
Dec 15/93

001B

LOCKHEED
MAINTENANCE MANUAL



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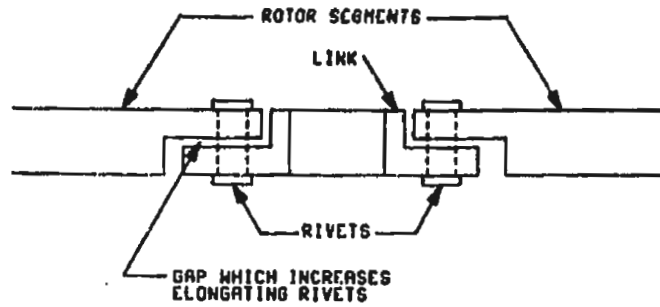
Brake Assembly - Removal and Installation
Figure 401

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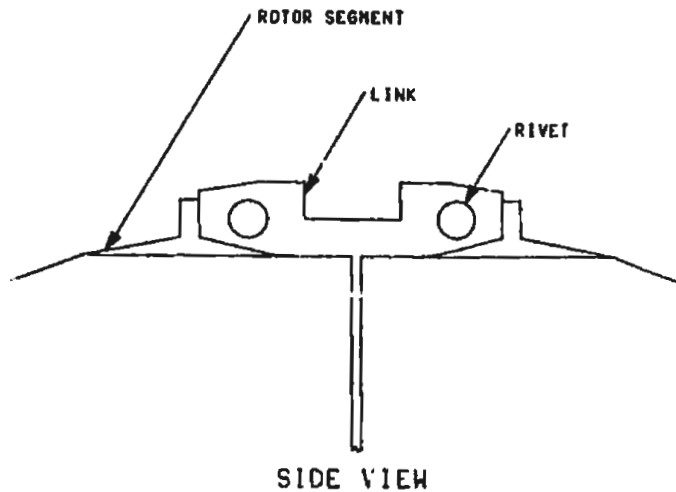
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32-43-01
Page 405
Nov 15/89

LOCKHEED
MAINTENANCE MANUAL



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MLG Brake Loose Link Rivets
Figure 402

R EFFECTIVITY: ALL
R
001B

32-43-01
Page 406
Jul 15/83

LOCKHEED
MAINTENANCE MANUAL

BRAKE ZERO-LEAK DISCONNECT--REMOVAL AND INSTALLATION

1. General

The brake zero-leak disconnect is in two halves, the nipple half contained in the brake assembly and the coupling half contained in the manifold. Each half is covered separately in this procedure.

2. Equipment and Materials

Lock-wire, QQ-W-390, 0.020-inch diameter, or equivalent

3. Referenced Procedures

24-00-00	Electrical Power - Maintenance Practices
29-11-00	Hydraulic Power System - Maintenance Practices
32-43-00	Main Landing Gear Brake System - Maintenance Practices

4. Removal/Installation

A. Nipple Half Removal

CAUTION: ENSURE THAT BRAKE PRESSURE HAS BEEN RELEASED (BRAKES OFF).

- (1) Remove bolts securing zero-leak disconnect manifold to brake assembly. Rotate manifold so that hydraulic line is moved toward truck beam to unlock from brake assembly (Ref. Fig. 401).
- (2) Remove locking bolts from brake assembly.
- (3) Using a thin-wall socket wrench, loosen nipple half.

R CAUTION: NIPPLE HALF IS SPRING LOADED TO MAINTAIN INTERNAL SEAL. SPRING WILL FORCE NIPPLE HALF OUT OF CAVITY WHEN THREADS ARE NOT ENGAGED. UNCONTROLLED DISENGAGEMENT OF THREADS MAY RESULT IN THREAD DAMAGE.

- (4) Apply downward pressure to nipple half and unscrew from brake assembly until nipple half is out of cavity.

EFFECTIVITY: ALL

001B

32-43-02
Page 401
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL

(5) Remove nipple half and spring.

B. Nipple Half Installation

- (1) Insert spring in brake assembly cavity.
- (2) Ensure that nipple half O-ring is undamaged or worn. Replace as required.
- (3) Position nipple half over spring and press downward on nipple half until threads can be engaged.
- (4) Screw nipple half into brake assembly.
- (5) Tighten nipple half to a torque of 30 lb in.
- (6) Install locking bolts. Tighten with screw driver.
- (7) Install manifold on brake assembly. Lock in place by rotating manifold so that hydraulic line is moved away from truck beam.
- (8) Secure manifold with bolts. Safety bolts with lock-wire.
- (9) Bleed brake assembly (Ref. 32-43-00).

C. Coupling Half Removal

- (1) Turn off hydraulic systems B and C pressure (Ref. 29-11-00).
- (2) Turn on electrical power (Ref. 24-00-00).
- (3) On Flight Engineer/Second Officers circuit breaker panel CB2, zone 215, ensure that PARKING BRAKE NO. 1 (G18), PARKING BRAKE NO. 2 (G22), and BRAKE PRES IND (G21) circuit breakers are closed.
- (4) On pilots center instrument panel, zone 210, place BRAKE SYS SELECT switch in NORM SYS B position.

R

CAUTION: MAIN LANDING GEAR WHEELS MUST BE CHOCKED FORWARD AND AFT BEFORE REDUCING BRAKE SYSTEM PRESSURE.

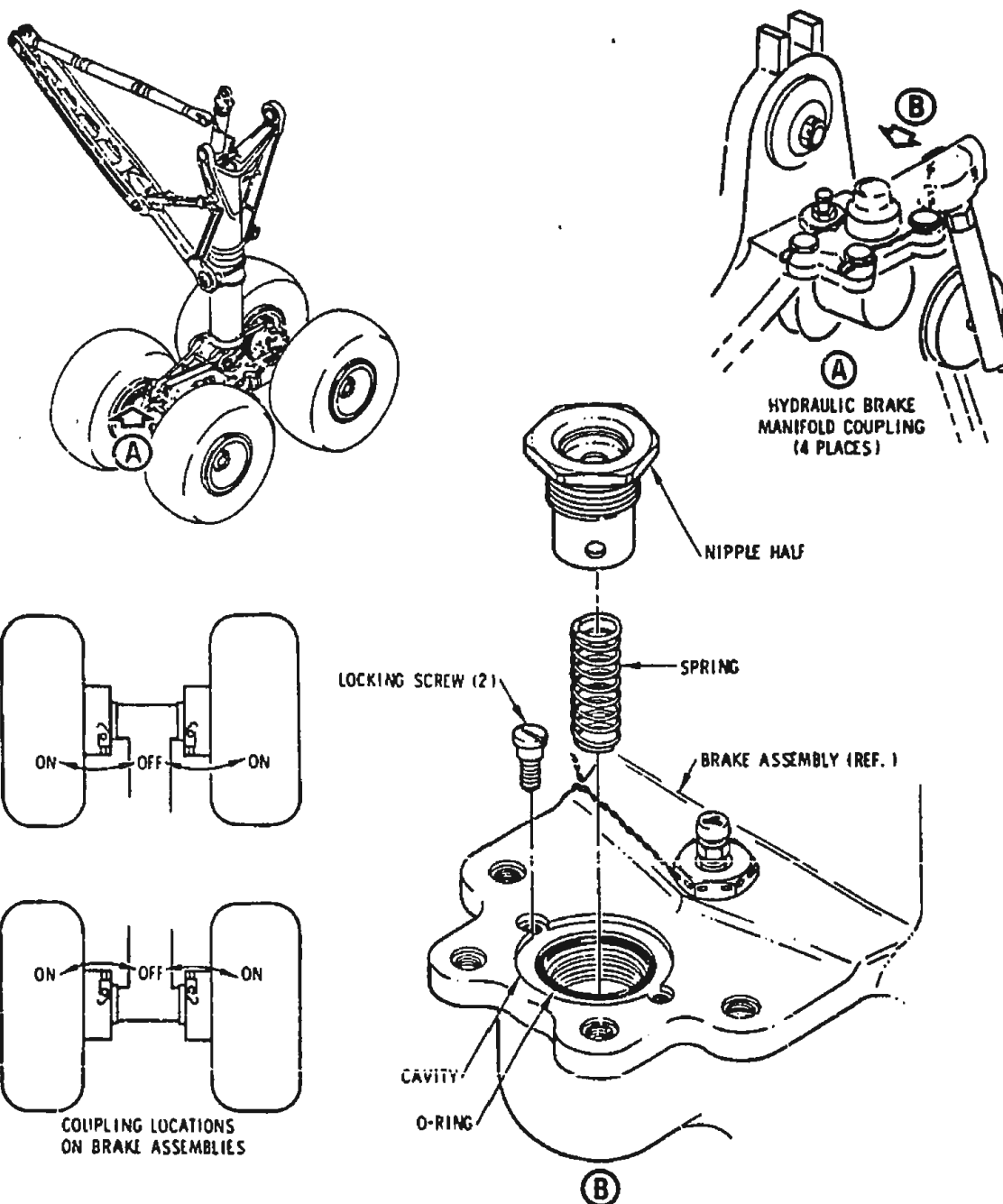
- (5) Pump brake pedals until normal brake system pressure is 0 psi.
- (6) On pilots center instrument panel, place BRAKE SYS SELECT switch in ALT SYS C position.

EFFECTIVITY: ALL

001B

32-43-02
Page 402
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



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Brake Zero-leak Disconnect Nipple Half
Removal and Installation
Figure 401

R R EFFECTIVITY: ALL
001B

32-43-02
Page 403
May 15/77



- (7) Pump brake pedals until alternate brake system pressure is 0 psi.
- (8) Remove bolts securing zero-leak disconnect manifold to brake assembly. Rotate manifold so that hydraulic line is moved toward truck beam to unlock from brake assembly (Ref. Fig. 402).
- (9) Using a 3/16-inch pin inserted through hole in coupling half pintle, loosen coupling half.

R

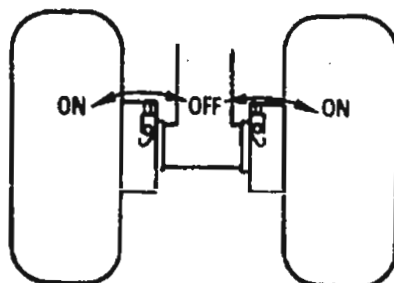
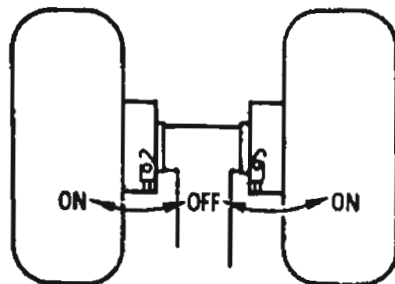
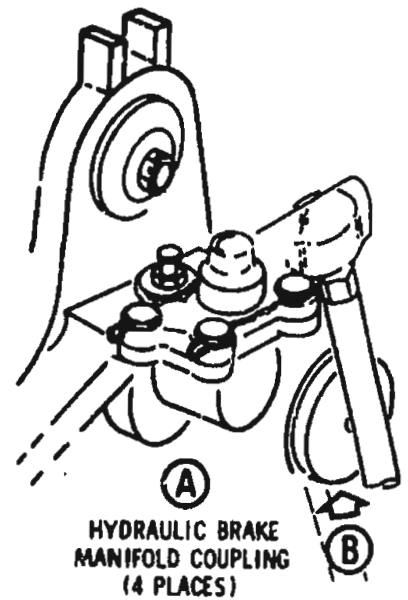
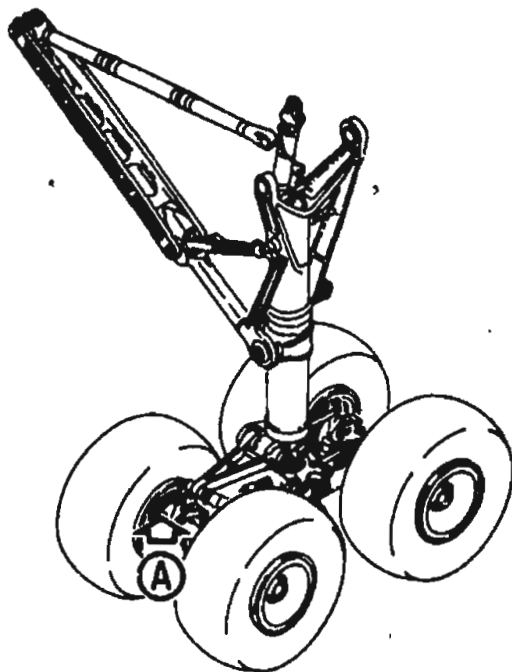
CAUTION: COUPLING HALF IS SPRING LOADED TO MAINTAIN INTERNAL SEAL. SPRING WILL FORCE COUPLING HALF OUT OF CAVITY WHEN THREADS ARE NOT ENGAGED. UNCONTROLLED DISENGAGEMENT OF THREADS MAY RESULT IN THREAD DAMAGE.

- (10) Apply inward pressure to coupling half and unscrew from manifold until coupling half is out of cavity.
- (11) Remove coupling half and spring.

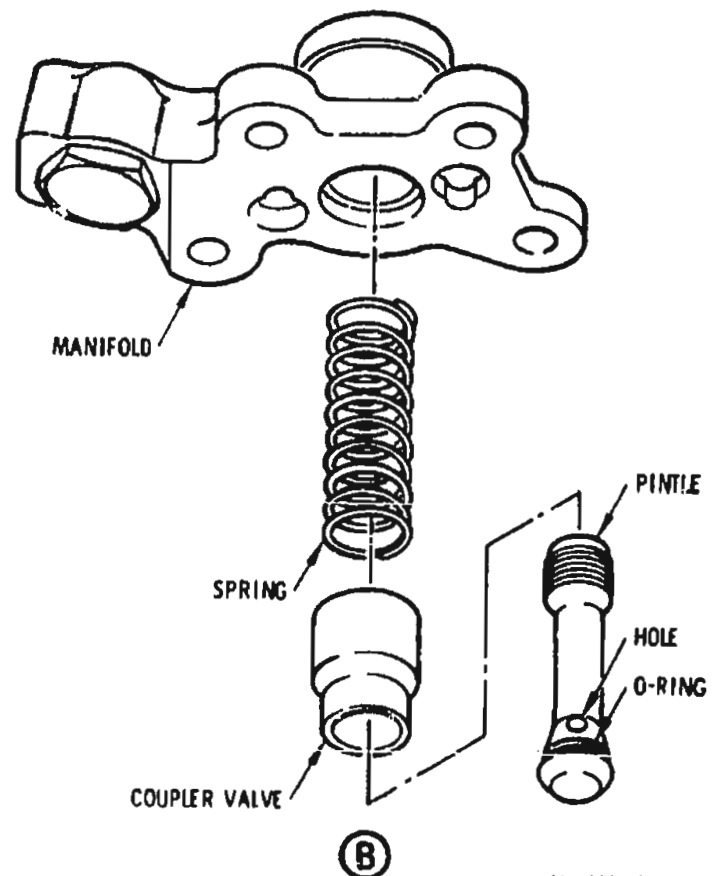
D. Coupling Half Installation

- (1) Ensure that O-ring in manifold cavity is undamaged or worn. Replace as required.
- (2) Insert spring in manifold cavity.
- (3) Position coupler valve over spring and insert pintle in coupler half and press inward until threads can be engaged.
- (4) Screw coupling half into manifold.
- (5) Tighten coupling half hand tight using pin through pintle hole.
- (6) Install manifold on brake assembly. Lock in place by rotating manifold so that hydraulic line is moved away from truck beam.
- (7) Secure manifold with bolts. Safety bolts with lock-wire.
- (8) Bleed brake assembly (Ref. 32-43-00).

LOCKHEED
MAINTENANCE MANUAL



COUPLING LOCATIONS
ON BRAKE ASSEMBLIES



MI-0100-32-374

**Brake Zero-leak Disconnect Coupling Half
 Removal and Installation
 Figure 402**

EFFECTIVITY: ALL

32-43-02
 Page 405/406
 Apr 15/73

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LOCKHEED
MAINTENANCE MANUAL

BRAKE SHUTTLE VALVE - REMOVAL AND INSTALLATION

1. Referenced Procedures

- | | |
|------------|--|
| 24-00-00 | Electrical Power - Maintenance Practices |
| 29-11-00 | Hydraulic Power System - Maintenance Practices |
| R 32-10-00 | Main Landing Gear Inboard Door - Maintenance Practices |
| R | |
| 32-43-00 | Brake System - Maintenance Practices |

2. Removal/Installation

A. Removal

- (1) Turn off hydraulic systems B and C pressure (Ref. 29-11-00).
- (2) Turn on electrical power (Ref. 24-00-00).
- (3) On pilots center instrument panel, zone 210, place BRAKE SYS SELECT switch in NORM SYS B or ALT SYS C position as applicable.
- (4) On Flight Engineer/Second Officers circuit breaker panel CB2, zone 215, ensure that circuit breakers PARKING BRAKE NO. 1 (G18), PARKING BRAKE NO. 2 (G22), and BRAKE PRES IND (G21) are closed.

CAUTION: MAIN LANDING GEAR WHEELS MUST BE CHOCKED FORWARD AND AFT BEFORE REDUCING BRAKE SYSTEM PRESSURE.

- (5) Pump brake pedals until normal and alternate brake pressures are 0 psi.
- R (6) Open applicable main landing gear (MLG) inboard door and install inboard door actuator lock (Ref. 32-10-00).
- R
- R (7) Remove 541AB or 641AB wing access panel, whichever is applicable.
- R (8) Prepare and rig equipment to catch spilled hydraulic fluid.
- R
- R (9) Disconnect inlet and outlet hydraulic lines (Ref. Fig. 401).

EFFECTIVITY: ALL

32-43-03
Page 401
Feb 15/74

LOCKHEED
MAINTENANCE MANUAL

- R (10) Install protective caps on hydraulic lines and valve
R ports.
- R (11) Remove mounting screws and washers, and remove shuttle
R valve.
- R (12) Turn off electrical power (Ref. 24-00-00).

B. Installation

- (1) Position valve and install mounting screws and washers.
- (2) Remove protective caps from hydraulic lines and valve ports, and connect inlet and outlet hydraulic lines.
- (3) Turn on electrical power (Ref. 24-00-00).

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

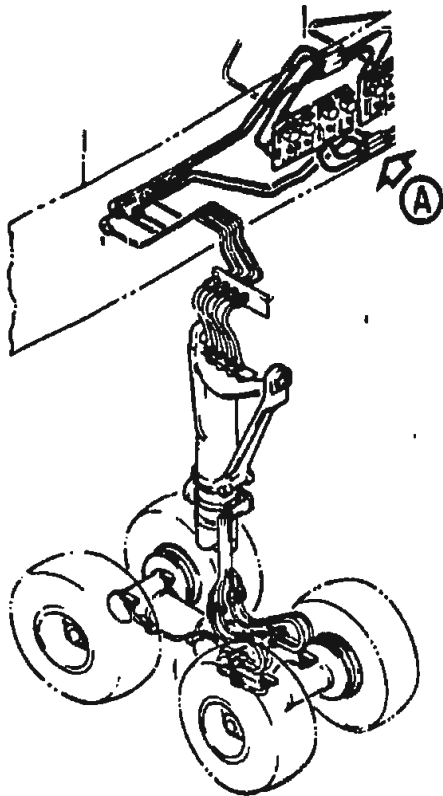
- (4) Turn on hydraulic systems B and C pressure (Ref. 29-11-00).
- (5) Ensure that circuit breakers called out in Step 2A(4) are closed.
- (6) Bleed brake system (Ref. 32-43-00).
- (7) Check for brake application in normal and alternate brake systems.
- R (8) Check shuttle valve fittings for leaks.
- R (9) Turn off hydraulic systems B and C pressure (Ref.
R 29-11-00).
- R (10) Turn off electrical power (Ref. 24-00-00).
- R (11) Close 541AB or 641AB wing access panel, whichever is
R applicable.
- R (12) Close MLG inboard door (Ref. 32-10-00).

EFFECTIVITY: ALL

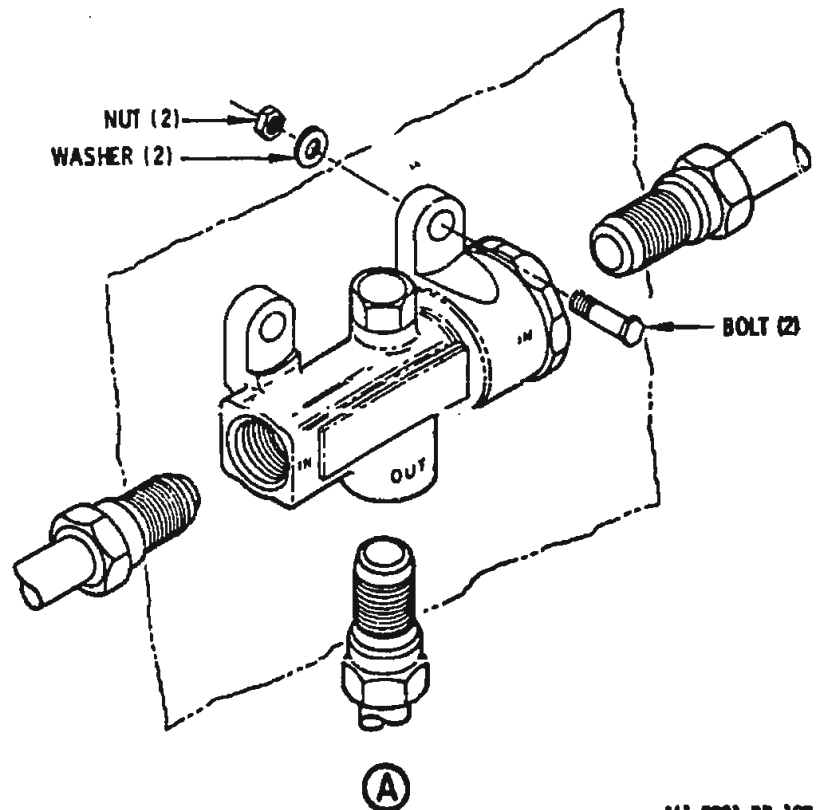
32-43-03

Page 402
Feb 15/74

LOCKHEED
MAINTENANCE MANUAL



MAIN LANDING GEAR
ZONE 730 AND 740



M1-0001-32-102

R
R Brake Shuttle Valve - Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-43-03
Page 403/404
Dec 15/80

0016

DUAL POWER BRAKE VALVE - REMOVAL AND INSTALLATION1. Referenced Procedures

- 24-00-00 Electrical Power - Maintenance Practices
- 29-11-00 Hydraulic Power System - Maintenance Practices
- 32-43-00 Main Landing Gear Brake System - Maintenance Practices
- R 32-43-00 Main Landing Gear Brake System - Adjustment and
R Test

R 2. Equipment and Materials

- R Protective Caps
- R Rig Pins
- R Cable Tensiometer, Pacific Scientific P/N 1601009-03 or
R equivalent
- R Cotter, Pin MS24665-154 or equivalent
- R Lock-wire, 0.032 inch, QQ-W-390 or equivalent

R 3. Removal/Installation

A. Removal

- (1) Turn on electrical power (Ref. 24-00-00).
- (2) On Flight Engineer/Second Officers circuit breaker panel CB2, ensure that PARKING BRAKE NO. 1 (G18) and PARKING BRAKE NO. 2 (G22) circuit breakers are closed.
- (3) Ensure that hydraulic systems B and C pressure is 0 psi.

CAUTION: MAIN LANDING GEAR WHEELS MUST BE CHOCKED FORWARD AND AFT BEFORE REDUCING BRAKE SYSTEM PRESSURE.

- (4) On pilots center instrument panel, zone 210, position BRAKE SYS SELECT switch to NORM SYS B.
- (5) Pump brake pedals until normal brake system hydraulic pressure is 0 psi.

EFFECTIVITY: ALL

32-43-04
Page 401
Nov 15/88



- (6) Position BRAKE SYS SELECT switch to ALT SYS C.
- (7) Pump brake pedals until alternate brake system hydraulic pressure is 0 psi.
- (8) Disconnect interconnect rod and brake control rod (Ref. Fig. 401)..
- (9) Rig suitable drainage equipment to catch spilled hydraulic fluid when lines are disconnected.
- (10) Loosen hydraulic line at PRESS valve boss to allow residual pressure to be released.
- (11) Remove hydraulic lines at PRESS, L BRAKE, R BRAKE, and RET. Cap all hydraulic lines.
- (12) Remove mounting bolts and remove valve. Cap all valve hydraulic fittings.
- (13) Turn off electrical power (Ref. 24-00-00).

B. Installation

- (1) Remove protective caps from hydraulic lines and fittings.
- (2) Position valve in place and secure with mounting bolts.
- (3) Connect hydraulic lines PRESS, L BRAKE, R BRAKE, and RET.
- (4) Rig the brake input system from the input quadrant to the dual power brake valves as follows:
 - (a) Before adjusting the brake control system turn off and tag hydraulic systems B and C (Ref. 29-11-00).
 - (b) In hydraulic service center, zone 147, disconnect override spring assemblies D1 and D2, and interconnect rod D3 (Ref. Fig. 402 View C).
 - (c) Restrain rods D1, D2 and D3 so full travel of bellcrank B1 is not restricted.
 - (d) Install four rig pins R1 in bellcranks B1 (Ref. Fig. 402 View B and Fig. 403).
 - (e) Preset turnbuckles T1 and T2 (Ref. Fig. 402 View B) as shown in Figure 402 View E.

R EFFECTIVITY: ALL

001B

32-43-04
Page 402
Nov 15/88



MAINTENANCE MANUAL

- (f) In forward electronic service center, zone 112, use tension adjusting turnbuckles (Ref. Fig. 402) to apply increasing tension to all APPLIED cables PBLA1, PBRA1, PBLA2, and PBRA2 until input quadrants Q1, Q2, Q3, and Q4 (Ref. Fig. 402 View D) are against off stops S1.
 - (g) Tighten APPLIED cable turnbuckles three turns, then OFF cable turnbuckles PBR01, PBL01, PBR02, and PBL02 three turns alternately until cable tension in all APPLIED cables is in accordance with cable tension chart, Figure 402 View J. Tolerance is ± 5 percent. Measure tension with a tensiometer. Do not adjust turnbuckles T1 and T2.
 - (h) Readjust all cable tensions, maintaining tension at chart value, until all quadrants are against off stops and rig pins R1 can be easily removed. Do not adjust turnbuckles T1 and T2.
 - (i) Reconnect override spring assemblies D1 and D2.
- CAUTION:** DO NOT ADJUST STOPS S3 ON VALVE ARM A1. STOPS S3 ARE ADJUSTED BY MANUFACTURER TO PROTECT VALVE SPOOL.
- (j) Adjust rod ends E1 and E (Ref. Fig. 402 View C) so that each dual power brake valve arm A1 is against off stops S2.
 - (k) Adjust and reconnect interconnect rod D3.
 - (l) Remove rig pins R1.
 - (m) Apply brake pedal pressure alternately to Captains and First Officers brake pedals and readjust cables as required to keep quadrants Q1, Q2, Q3, and Q4 against off stops S1 and allow installation of rig pins R1 in bellcranks B1. Check cable tension to ensure that it remains within tolerances ± 5 percent shown in Figure 402 View J.
 - (n) Install two rig pins R1 in bellcranks B1 on right side only. Depress Captains brake pedals fully and observe that right override spring assemblies D2 work freely.
 - (o) Remove rig pins R1 from bellcranks B1 and install in bellcranks B1 on left side. Depress First Officers brake pedals fully and observe that left override spring assemblies D1 work freely.

R EFFECTIVITY: ALL

001B

32-43-04
Page 403
Nov 15/88



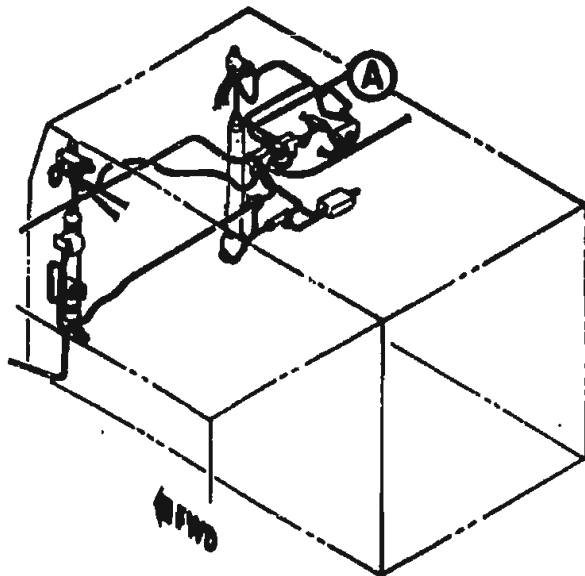
- (p) Remove rig pins R1 from bellcranks B1.
 - (q) Safety interconnect rod D3 rod end and override spring D1 and D2 rod ends with cotter pins.
 - (r) Safety interconnect rod D3 and override spring D1 and D2 adjustment lock nuts with 0.032 inch lock-wire.
- (5) Adjust brake control rod ends so that each valve arm is against the off stops (valve arms to right) and install link rod bolt.

NOTE: When only one valve is being installed, adjust only the associated brake control rod ends.

CAUTION: DO NOT ADJUST SCREW STOPS ON VALVE ARMS. THE SCREW STOPS, WHICH POSITION SPOOLS INSIDE OF VALVE ARE PRESET.

- (6) Connect interconnect link after adjusting it to fit new override spring rod end adjustment.
- (7) Remove rig pins.
- (8) Bleed air from brakes (Ref. 32-43-00).
- (9) Bleed air from applicable B or C hydraulic system (Ref. 29-11-00).
- (10) If B hydraulic system brake valve has been replaced, perform Parking Brake Pressure Test of MLG Brake System - Adjustment and Test (Ref. 32-43-00).

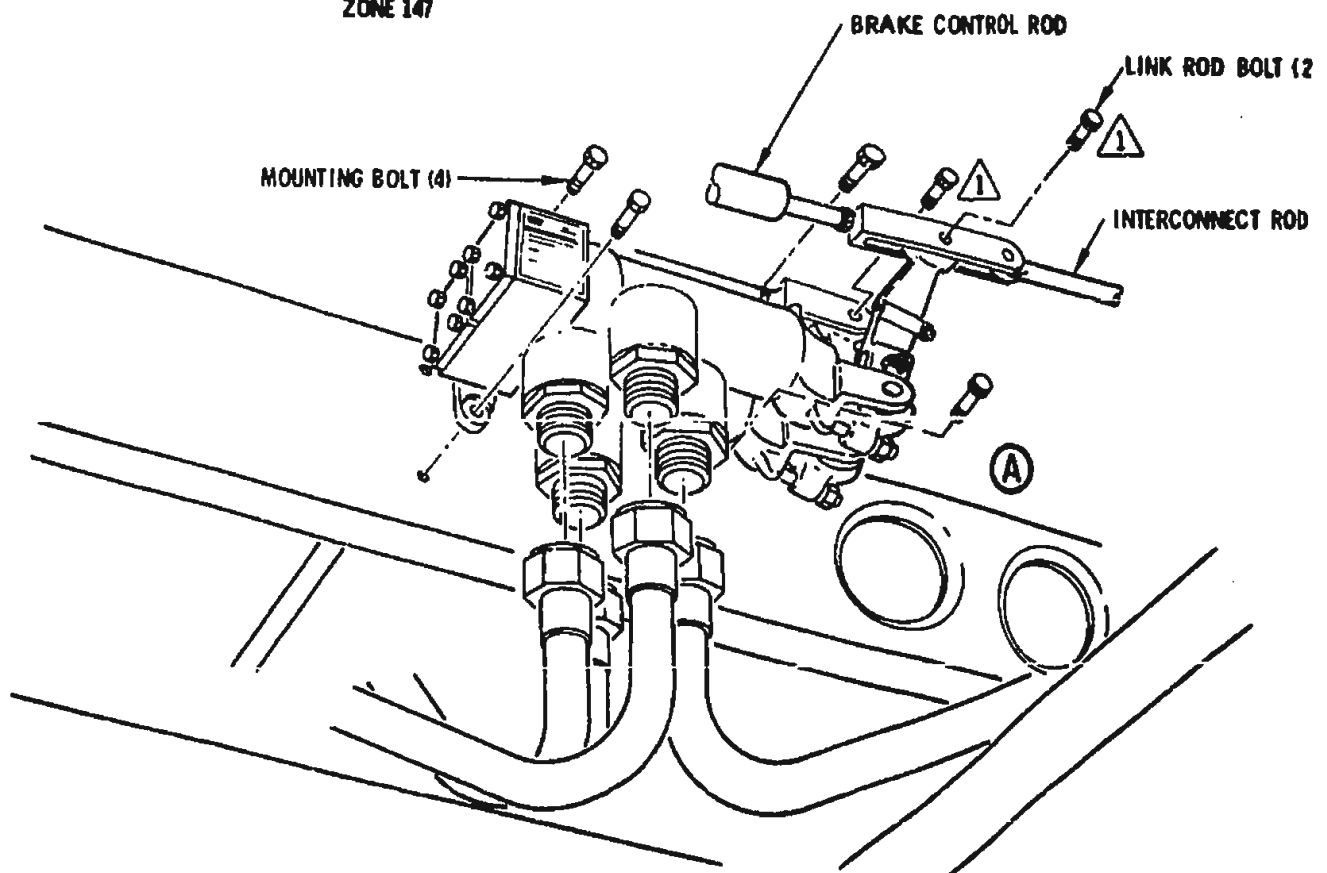
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HYDRAULIC SERVICE CENTER
ZONE 147

NOTE

- SPRING ASSEMBLIES OMITTED FOR CLARITY
⚠ ENSURE BOLTHEADS FACE AFT. LEFT SIDE
BRAKE VALVE SHOWN



M1-0003-32-099

Dual Power Brake Valve - Removal and Installation
Figure 401

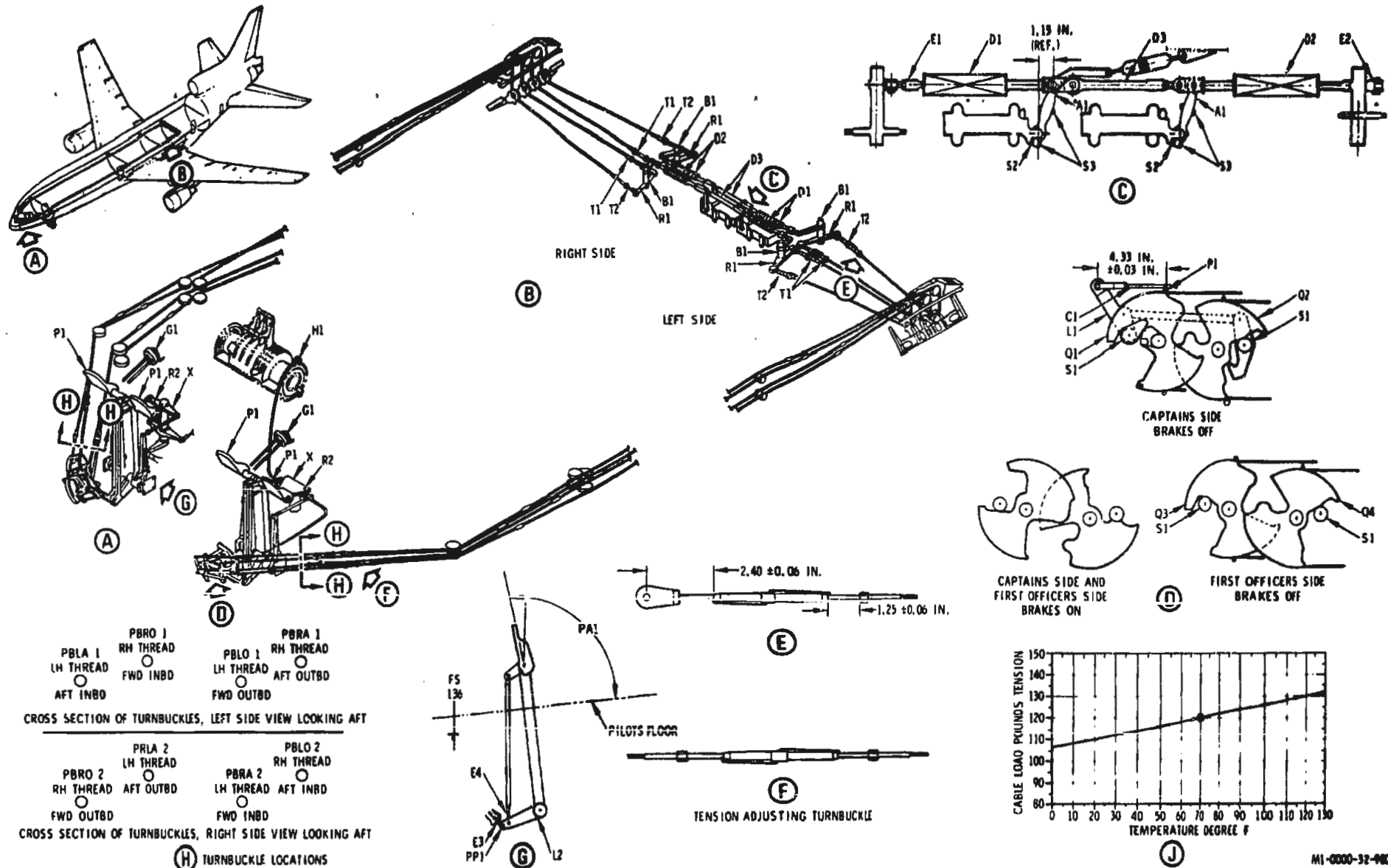
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EFFECTIVITY: ALL

32-43-04
Page 405/406
Jul 15/84



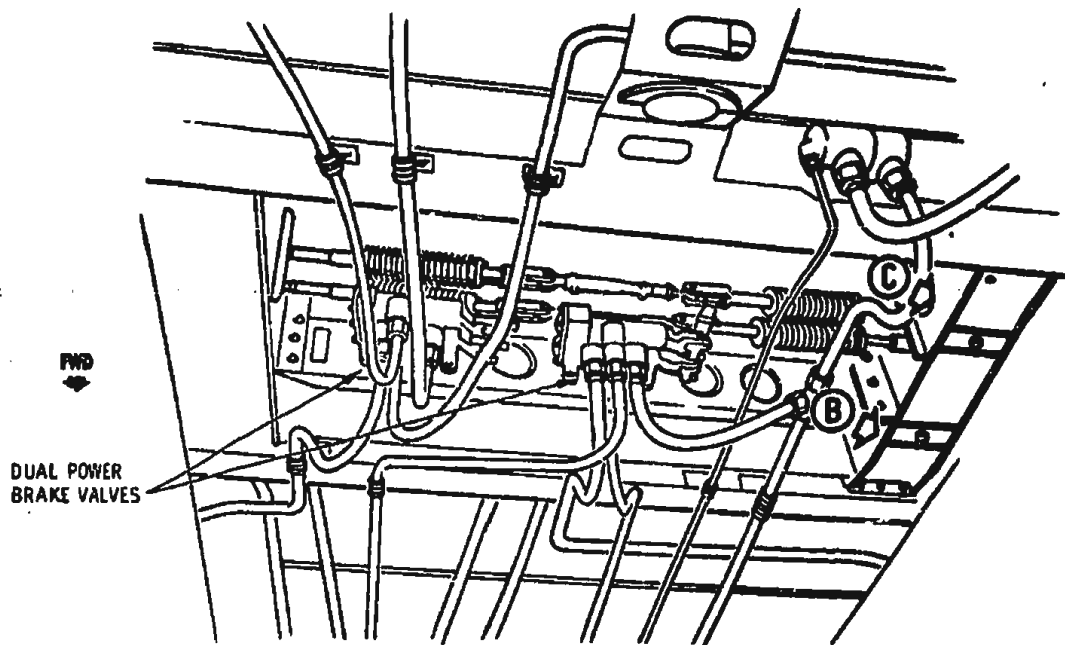
Brake System Adjustment and Test
Figure 402

EFFECTIVITY: ALL

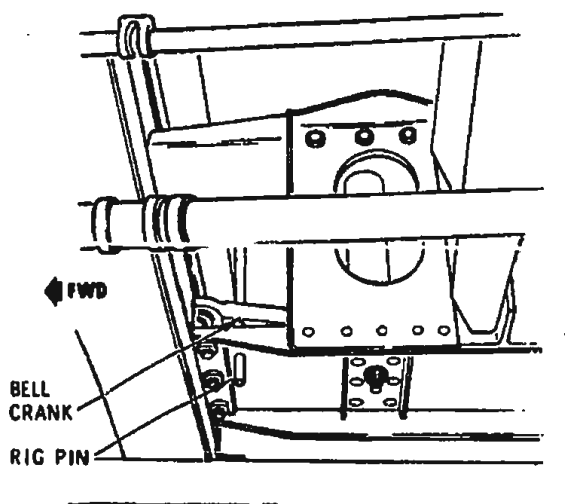
32-43-04
Page 407/408
Jul 15/84

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LOCKHEED
MAINTENANCE MANUAL

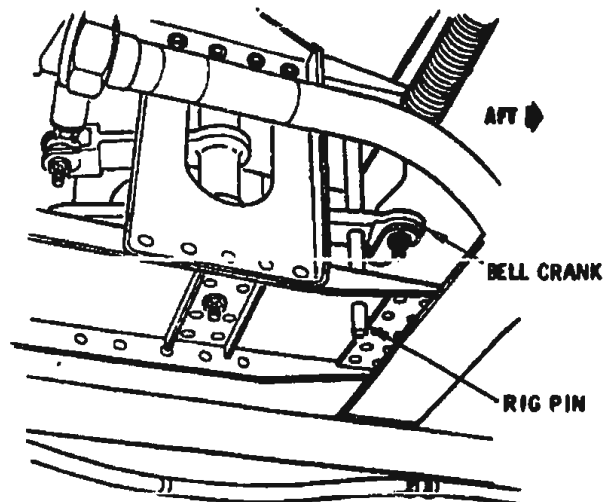


(A)



(B)

RIGHT SIDE SHOWN
LEFT SIDE OPPOSITE



(C)

RIGHT SIDE SHOWN
LEFT SIDE OPPOSITE

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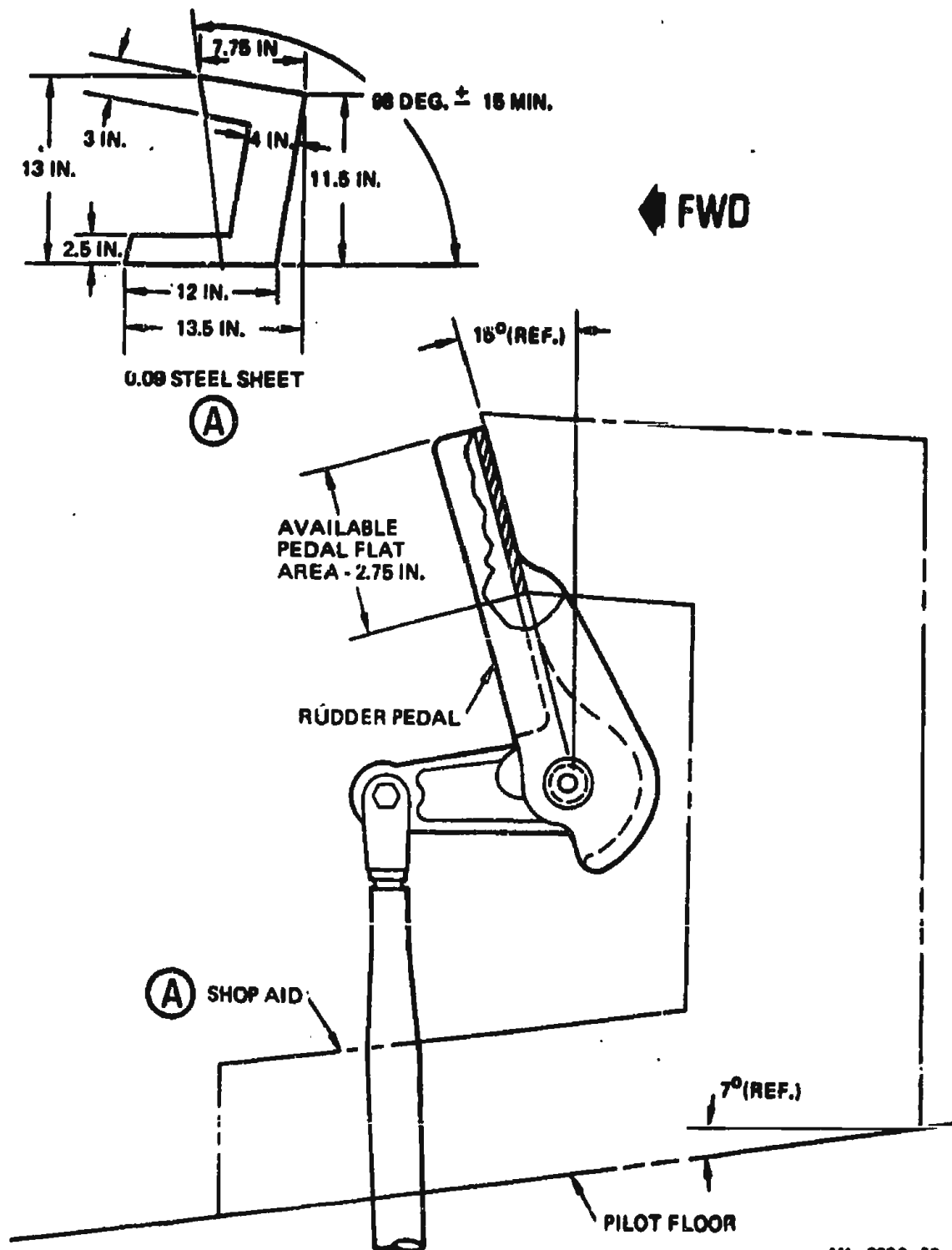
Aft Rig Pin Positioning
Figure 403

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EFFECTIVITY: ALL

32-43-04
Page 409
Jul 15/84

LOCKHEED
MAINTENANCE MANUAL



M1-0000-32-881

Rudder Pedal Angle
Figure 404

32-43-04
Page 410
Jul 15/84

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EFFECTIVITY: ALL

BRAKE SUPPLY MODULE - REMOVAL AND INSTALLATION1. General

There are two brake supply modules, one for each brake system. The normal brake supply module is normally open and the alternate brake supply module is normally closed. Hydraulic system B supplies the normal brake supply module and hydraulic system C supplies the alternate brake supply module. Hydraulic pressure must be reduced to 0 psi, only in the hydraulic system supplying the module to be removed.

2. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent.

Lock-wire, Fed Spec QQ-W-390, 0.040-inch diameter, or equivalent

3. Referenced Procedures

24-00-00 Electrical Power - Maintenance Practices

29-11-00 Hydraulic Power System - Maintenance Practices

4. Removal/Installation

A. Removal

(1) Turn off applicable hydraulic system B or C pressure (Ref. 29-11-00).

(2) Verify that electrical power is on (Ref. 24-00-00).

R CAUTION: MAIN LANDING GEAR WHEELS MUST BE CHOCKED FORWARD AND AFT BEFORE REDUCING BRAKE SYSTEM PRESSURE.

(3) On pilots center instrument panel, zone 210, place BRAKE SYS SELECT switch in NORM SYS B or ALT SYS C position as applicable.

(4) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, ensure that circuit breakers PARKING BRAKE NO. 1 (G18), PARKING BRAKE NO. 2 (G22), and BRAKE PRESS IND (G21) are closed.

EFFECTIVITY: ALL



MAINTENANCE MANUAL

- (5) Pump brake pedals until applicable normal or alternate brake system pressure is 0 psi.
- (6) Open and tag circuit breakers called out in Step 4A(4).
- (7) Open hydraulic service center, zone 147, access door 147AB or 147BB.
- (8) Disconnect low brake pressure switch, brake pressure transmitter, and brake control electrical connectors (Ref. Fig. 401).
- (9) Remove low brake pressure switch and brake pressure transmitter.
- (10) Provide suitable drainage devices and rags to catch any spilled hydraulic fluid.
- (11) Disconnect hydraulic lines.
- (12) Remove bolts securing brake supply module to mounting bracket.
- (13) Remove brake supply module.

B. Installation

- (1) Ensure that circuit breakers opened in Step 4A(6) are open and tagged.

CAUTION: A NORMALLY OPEN (N.O.) MODULE ONLY MUST BE INSTALLED IN THE NORMAL BRAKE "B" SYSTEM. Mfr 1512433-105, -109, -115 MODULE (Mfr 72515-2, -3, -4 VALVE). A NORMALLY CLOSED (N.C.) MODULE ONLY MUST BE INSTALLED IN THE ALTERNATE BRAKE "C" SYSTEM. Mfr 1512433-113, -117 MODULE (Mfr 72516-3, -4 VALVE).

C
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C

NOTE: Each module is clearly identified on its nameplate by part number with the letters N.O. or N.C.

In addition, the cartridge in each module must be identified with the matching letters N.O. or N.C. The letters must be clearly stamped on the cartridge face following the supplier part number.

- (2) Secure brake supply module to mounting bracket with bolts, washers, and nuts.
- (3) Connect hydraulic lines.

EFFECTIVITY: ALL

001B

32-43-06
Page 402
Jul 15/83



- (4) Install low brake pressure switch and brake pressure transmitter. Safety with 0.040-inch diameter lock-wire.
- (5) Connect electrical connectors. Safety with 0.020-inch diameter lock-wire.
- (6) Remove tags and close circuit breakers opened in Step 4A(6).
- (7) Verify that electrical power is on.
- (8) On pilots center instrument panel, ensure that BRAKE SYS SELECT switch is in NORM SYS B or ALT SYS C position, as applicable.
- (9) On pilots center instrument panel, zone 210, verify that applicable BRAKE PRESS indication is 0. psi.
- (10) On Flight Engineer/Second Officers hydraulic system panel, zone 215, verify that applicable BRAKE ACCUM NORM or ALT LOW PRESS indicator light is on.

R

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (11) Turn on applicable hydraulic system B or C pressure (Ref. 29-11-00). Check hydraulic couplings for leaks.
- (12) Bleed brake system (Ref. 32-43-00).
- (13) On pilots center instrument panel, verify that applicable BRAKE PRESS indication is between 2400 and 3150 psi.
- (14) On Flight Engineer/Second Officers hydraulic system panel, verify that applicable BRAKE ACCUM NORM or ALT LOW PRESS indicator light is off.
- (15) Depress brake pedals. Visually check that brakes actuate.

EFFECTIVITY: ALL

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32-43-06
Page 403
Aug 15/81

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MAINTENANCE MANUAL

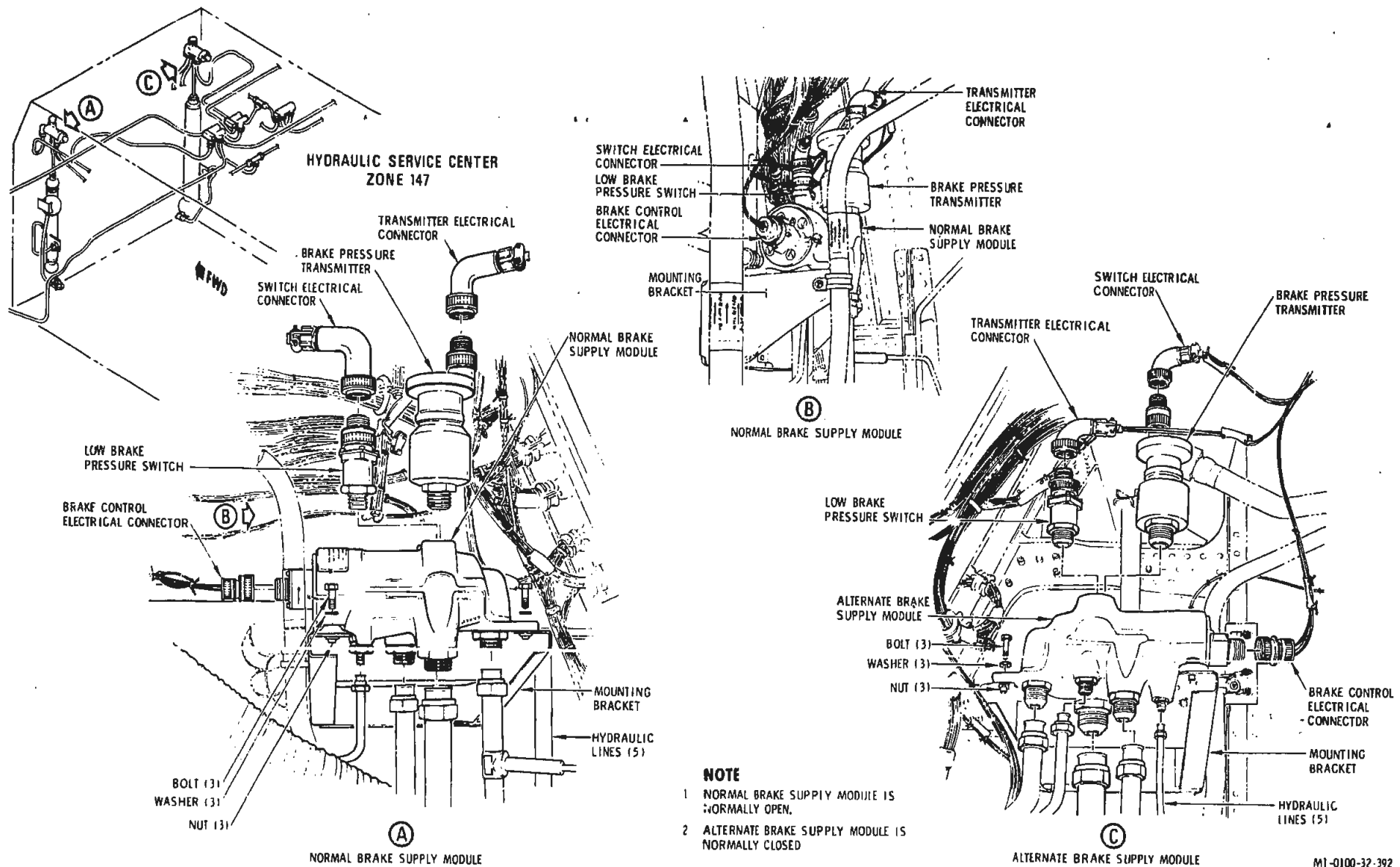
- (16) On pilots center instrument panel BRAKE SYS SELECT switch, select brake system (NORM SYS B or ALT SYS C) which was not affected. If ALT SYS C is selected, ensure that indicator buttons on both brake supply modules are out indicating that all control valves are operational.
- (17) Depress brake pedals. Visually check that brakes actuate.
- (18) If alternate brake system was used, position BRAKE SYS SELECT switch to NORM SYS B.
- (19) Bleed air from applicable hydraulic system reservoir (Ref. 29-11-00).
- (20) Turn off applicable hydraulic system B or C pressure (Ref. 29-11-00).
- (21) Turn off electrical power (Ref. 24-00-00).
- (22) Close hydraulic service center door.

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EFFECTIVITY: ALL

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32-43-06
Page 404
Jun 15/79



Brake Supply Module - Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-43-06
Page 405/406
Jun 15/73

M1-0100-32-392

**BRAKE_SUPPLY_MODULE_CARTRIDGE_-_REMOVAL_AND_INSTALLATION****1. General**

There are two brake supply modules: one for normal brake operation and one for alternate brake operation. The normal module, which is normally open, is supplied by hydraulic system B. The alternate module, which is normally closed, is supplied by hydraulic system C. The valve cartridges are indexed so that they cannot be inadvertently interchanged. Reduce pressure only in the hydraulic system supplying the particular module to be removed.

2. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent

3. Referenced Procedures

24-00-00	Electrical Power - Maintenance Practices
29-11-00	Hydraulic Power System - Maintenance Practices
32-43-00	Main Landing Gear Brake System - Maintenance Practices

4. Removal/Installation**A. Removal**

- (1) Turn off applicable hydraulic system B or C pressure (Ref. 29-11-00).
- (2) Turn on electrical power (Ref. 24-00-00).

R **CAUTION:** MAIN LANDING GEAR WHEELS MUST BE CHOCKED FORWARD AND AFT BEFORE REDUCING BRAKE SYSTEM PRESSURE.

- (3) On pilots center instrument panel, zone 210, place BRAKE SYS SELECT switch in NORM SYS B or ALT SYS C position as applicable.
- (4) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, ensure that circuit breakers PARKING BRAKE NO. 1 (G18), PARKING BRAKE NO. 2 (G22), and BRAKE PRESS IND (G21) are closed.

EFFECTIVITY: ALL

32-43-07
Page 401
Aug 15/81

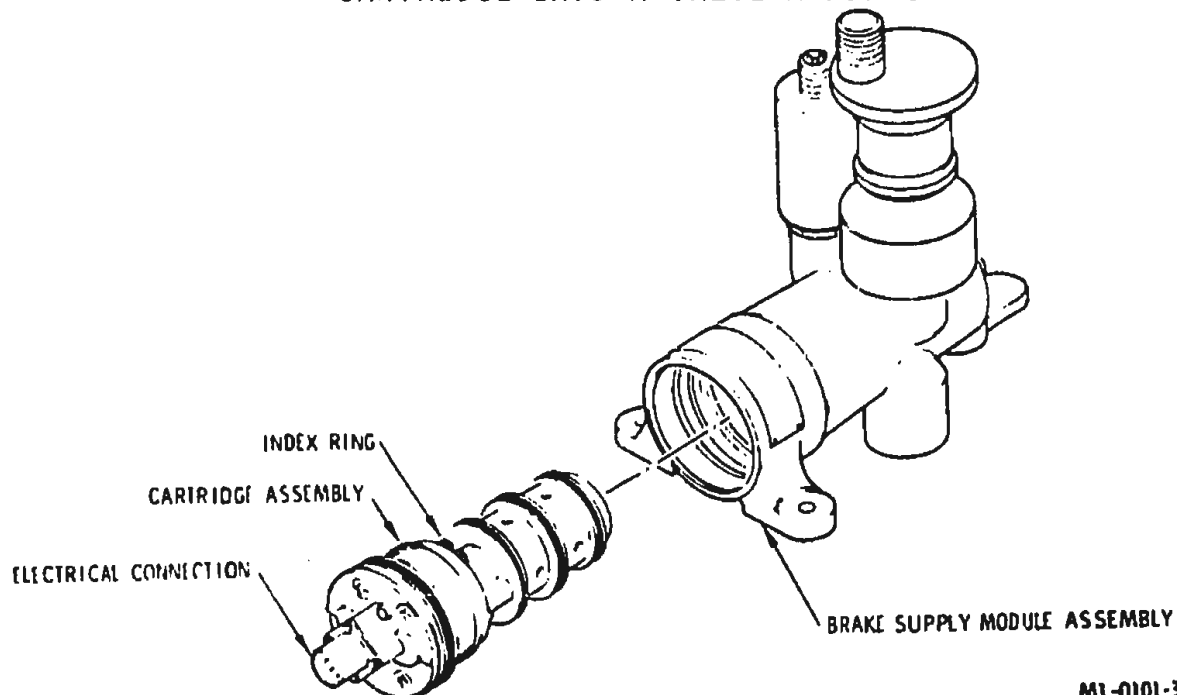


- (5) Pump brake pedals until applicable normal or alternate brake pressure is 0 psi.
- (6) Open and tag circuit breakers called out in Step 4A(4).
- (7) Open hydraulic service center access doors 147AB and 147BB.
- (8) Remove electrical connector from cartridge (Ref. Fig. 401).
- (9) Provide a bucket, rags, and rig suitable drainage devices to catch hydraulic fluid.
- (10) Unscrew and remove cartridge.

B. Installation

- (1) Verify that circuit breakers opened in Step 4A(4) are open and tagged.
- (2) Coat cartridge seals and threads with hydraulic fluid.

CAUTION: REPLACEMENT CARTRIDGE MUST BE COMPLETE WITH THE INDEX RING TO PREVENT INSTALLATION OF AN INCORRECT CARTRIDGE INTO A VALVE MODULE.



M1-0101-32-095

Brake Supply Module Cartridge - Removal and Installation
Figure 401

EFFECTIVITY: ALL



- (3) Align index ring with grooves in threaded portion of module and push cartridge into position to contact threads.
- (4) Screw cartridge in by hand until firmly seated.
- (5) Torque cartridge 80(±10) lb in.
- (6) Connect electrical connector and safety with lock-wire.
- (7) Remove tags and close circuit breakers opened in Step 4A(6).
- (8) Turn on electrical power (Ref. 24-00-00).
- (9) On pilots center instrument panel, zone 210, verify that applicable BRAKE PRESS indication is 0. psi.
- (10) On Flight Engineer/Second Officers hydraulic system panel, zone 215, verify that applicable BRAKE ACCUM NORM or ALT LOW PRESS indicator light is on.
- (11) On pilots center instrument panel, place BRAKE SYS SELECT switch in NORM SYS B or ALT SYS C position, as applicable.

R **WARNING:** VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (12) Turn on applicable hydraulic system B or C pressure (Ref. 29-11-00).
- (13) Bleed brake system (Ref. 32-43-00).
- (14) On pilots center instrument panel, verify that applicable BRAKE PRESS indication is between 2400 and 3150 psi.
- (15) On Flight Engineer/Second Officers hydraulic system panel, verify that applicable BRAKE ACCUM NORM or ALT LOW PRESS indicator light is off.

EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL

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- (16) Depress brake pedals. Visually check that brakes actuate.
 - (17) On pilots center instrument panel BRAKE SYS SELECT switch, select brake system (NORM SYS B or ALT SYS C) which was not affected. If ALT SYS C is selected, ensure that indicator buttons on both brake supply modules are out indicating that all control valves are operational.
- R
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- (18) Depress brake pedals. Visually check that brakes actuate.
 - (19) If alternate brake system was used, position BRAKE SYS SELECT switch to NORM SYS B.
 - (20) Bleed air from applicable hydraulic system reservoir (Ref. 29-11-00).
 - (21) Turn off applicable hydraulic system B or C pressure (Ref. 29-11-00).
 - (22) Turn off electrical power (Ref. 24-00-00).
 - (23) Close hydraulic service center doors.

001B EFFECTIVITY: ALL

32-43-07
Page 404
Jun 15/79



R BRAKE SUPPLY VALVE -- INSPECTION AND CHECK

R 1. General

R The B system supply valve is normally de-energized OPEN and the
R C system is de-energized CLOSED. The following procedure
R provides a check of brake supply valves to determine that the B
R system supply valves can be energized CLOSED and the C system
R supply valves can be energized OPEN.

R 2. Inspection/Check

R Operation of the brake supply valves is verified as follows.

R A. Flight Station Check

R (1) Chock wheels and release parking brake.

R (2) Pressurize both system B and C brake accumulators using
R AC motor pumps, then turn off pumps.

R NOTE: Hydraulic system B and C should not be
R pressurized while performing this check.

R (3) Select alternate system C with brake system select
R switch on pilot's center instrument panel.

R (4) Pump brake pedals. B system brake pressure, as
R indicated on pilot's center instrument panel gage,
R should remain steady, and C system brake pressure
R should decay as pedals are pumped. If B system
R pressure decays, the NORM system B brake supply valve
R has failed.

R (5) If unable to perform flight station check, or if
R results are inconclusive or suspect perform Visual
R Check (Ref. Para. B.)

R B. Visual Check

R (1) Pressurize both B and C hydraulic systems.

R (2) Select ALT SYS C with brake system select switch on
R pilot's center instrument panel.

R (3) Chock wheels and release parking brake.

R (4) Gain access to both brake supply valve modules in
R hydraulic service center, located above B and C system

R EFFECTIVITY: ALL

LOCKHEED



MAINTENANCE MANUAL

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accumulators in left and right forward corners of service center.

R
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- (5) Check that two indicator pins, located adjacent to electrical connector on each valve, are protruding from both B and C brake supply valves.

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R
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R

NOTE: A total of four indicator pins, two on each supply valve, should protrude for the valves to be fully functional. At least one indicator pin on each supply valve must be protruding for the supply valves to be operational. If both pins are flush on either valve, that valve has failed.

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EFFECTIVITY: ALL

001B

32-43-07
Page 602
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL

BRAKE ACCUMULATOR, 200 CUBIC INCH, - REMOVAL AND INSTALLATION

1. Referenced Procedures

12-14-11	Landing Gear Brake Accumulator Charging
24-00-00	Electrical Power - Maintenance Practices
29-11-00	Hydraulic Power System - Maintenance Practices
32-43-00	Main Landing Gear Brake System - Maintenance Practices

2. Removal/Installation

A. Removal

- (1) Turn on electrical power (Ref. 24-00-00).
- (2) Turn off hydraulic system B pressure (Ref. 29-11-00).

R **CAUTION:** MAIN LANDING GEAR WHEELS MUST BE CHOCKED FORWARD AND AFT BEFORE REDUCING BRAKE PRESSURE.

- (3) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, (G22) zone 215, ensure that circuit breakers PARKING BRAKE NO. 1 (G18) PARKING BRAKE NO. 2 (G22), and BRAKE PRESS IND (G21) are closed.
- (4) On pilots center instrument panel, zone 210, place BRAKE SYS SELECT switch in NORM SYS B position.
- (5) Actuate brake pedals until brake pressure is 0 psi.
- (6) Open hydraulic service center access doors 147AB and 147BB.
- (7) Bleed air or nitrogen pressure from normal brake system accumulator to 0 psi.
- (8) Disconnect air or nitrogen line at bottom of accumulator and cap line and accumulator fitting (Ref. Fig. 401).
- (9) Install suitable runoff equipment to collect hydraulic fluid. Place rags around top of accumulator at hydraulic fitting.

EFFECTIVITY: ALL

001B

32-43-09
Page 401
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL

- (10) Disconnect hydraulic line at top of accumulator, and cap hydraulic line and plug accumulator.
- (11) Hold accumulator in place and remove upper and lower mounting clamps.
- (12) Remove accumulator.
- (13) Turn off electrical power (Ref. 24-00-00).

B. Installation

- (1) Position accumulator in clamps so that air or nitrogen line can be connected. Close clamps but do not tighten.
- (2) Remove caps from air or nitrogen line and fitting and connect line to bottom fitting of accumulator.
- (3) Remove caps from hydraulic line and fitting and connect hydraulic line to top fitting of accumulator.
- (4) Tighten clamps.
- (5) Pressurize normal brake system accumulator with air or nitrogen (Ref. 12-14-11).

R **WARNING:** VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (6) Turn on electrical power (Ref. 24-00-00).
- (7) Ensure that circuit breakers called out in Step 2A(3) are closed.
- (8) Turn on hydraulic system B pressure (Ref. 29-11-00).
- (9) Check for air or nitrogen and hydraulic leaks.
- (10) Bleed brake system (Ref. 32-43-00).
- (11) Turn off electrical power (Ref. 24-00-00).

EFFECTIVITY: ALL

001B

32-43-09
Page 402
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL

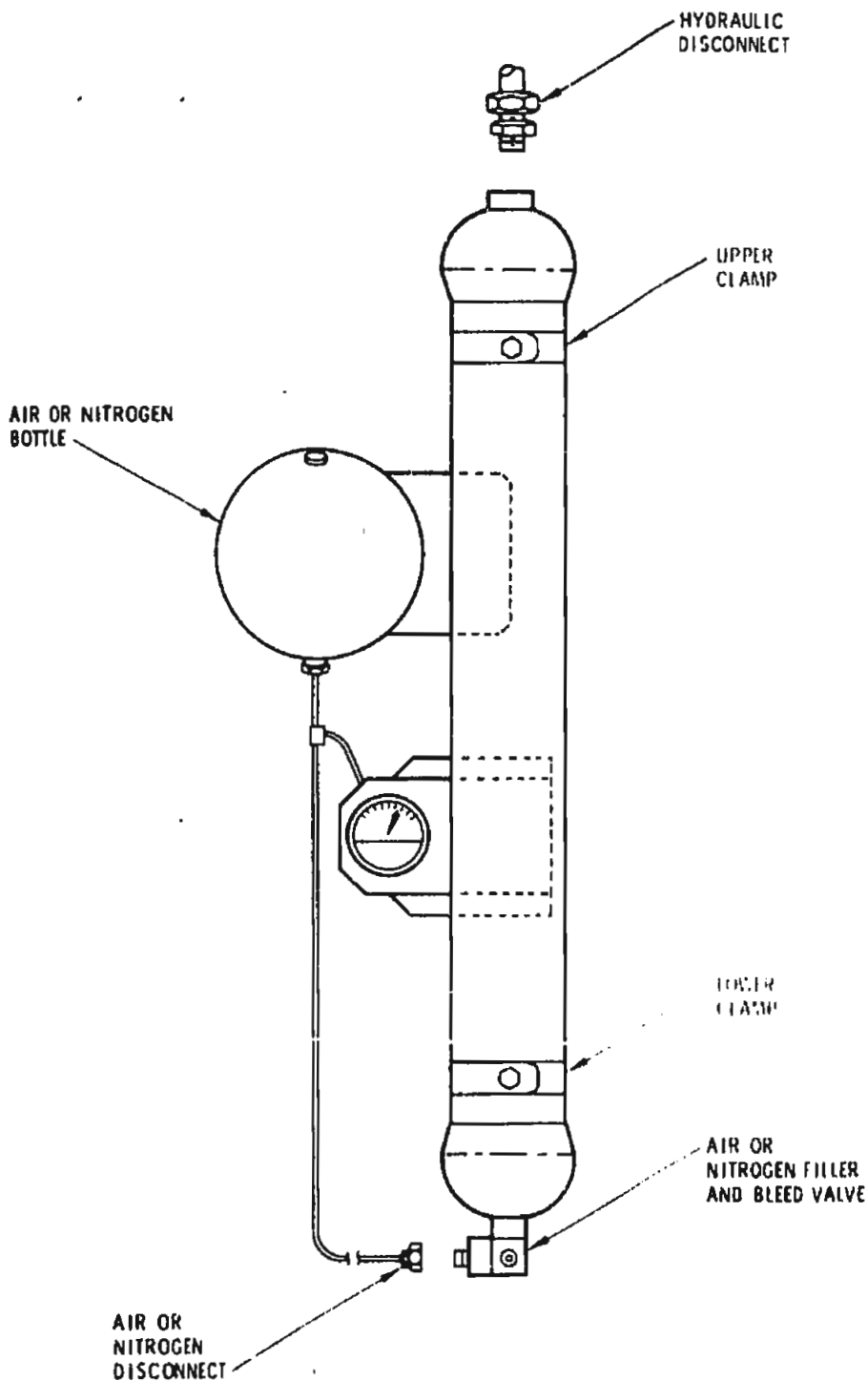
- (12) Turn off hydraulic system B pressure (Ref. 29-11-00).
- (13) Close hydraulic service center access doors.

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EFFECTIVITY: ALL

32-43-09
Page 403
Dec 1/72

LOCKHEED
MAINTENANCE MANUAL



HH 5214
 M1-0101-32-097

Brake Accumulator, 200 Cubic Inch - Removal and Installation
Figure 401

32-43-09
 Page 404
 May 15/73

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MAINTENANCE MANUAL

BRAKE ACCUMULATOR (707 CUBIC INCH) - REMOVAL AND INSTALLATION

1. Referenced Procedures

- 12-14-11 Landing Gear Brake Accumulator Charging
- 24-00-00 Electrical Power - Maintenance Practices
- 29-11-00 Hydraulic Power System - Maintenance Practices
- 32-43-00 Main Landing Gear Brake System - Maintenance Practices

2. Equipment and Materials

Tape, (0.002 x 1") MACAL DW 0075, Morgan Adhesives, 4650 Darrow Rd, Stow, Ohio 44224, or equivalent

3. Removal/Installation

A. Removal

- (1) Turn on electrical power (Ref. 24-00-00).
- (2) Turn off hydraulic system C pressure (Ref. 29-11-00).

- R CAUTION: MAIN LANDING GEAR WHEELS MUST BE CHOCKED FORWARD AND AFT BEFORE REDUCING BRAKE SYSTEM PRESSURE.
- (3) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, ensure that circuit breakers PARKING BRAKE NO. 1 (G18), PARKING BRAKE NO. 2 (G22), and BRAKE PRESS IND (G21) are closed.
 - (4) On pilots center instrument panel, zone 210, place BRAKE SYS SELECT switch in ALT SYS C position.
 - (5) Actuate brake pedals until brake pressure is 0 psi.
 - (6) Open hydraulic service center access doors 147 AB and 147 BB.
 - (7) Bleed air or nitrogen pressure from alternate brake system accumulator to 0 psi.
 - (8) Turn off electrical power (Ref. 24-00-00).

EFFECTIVITY: ALL

001B

32-43-11
Page 401
Aug 15/81



- R (9) Disconnect air or nitrogen line at bottom of accumulator. Cap line and accumulator fitting (Ref. Fig. 401).
- R (10) Install suitable run-off equipment to collect hydraulic fluid. Place rags around top of accumulator at hydraulic fitting.
- R (11) Disconnect and cap hydraulic line at top of accumulator. Plug accumulator.
- R (12) Hold accumulator in place, and remove upper clamp and lower mounting bolt.
- R (13) Remove accumulator.

B. Installation

- R (1) Remove hydraulic tube end plug and accumulator cap.
- R (2) In area of upper clamp wrap a single layer of MACAL DW 0075 tape around accumulator, overlap tape 1 inch (Ref. Fig. 401).
- R (3) Position accumulator in top clamp and bottom mounting bracket. Install clamp and lower mounting bolt.
- R (4) Using new gasket, install adapter on end cap hydraulic port. Reconnect hydraulic tube.
- R (5) Remove plug and cap from line and air charge valve and connect air or nitrogen line. Using two new packings, install lower bolt and air valve adapter body with valve on accumulator air port. Position air valve in vertical plane pointing up. Install 0.020 diameter lock-wire.
- R (6) Pressurize alternate brake system accumulator with air or nitrogen (Ref. 12-14-11).
- R (7) Remove caps from hydraulic line and fitting, and connect hydraulic line to top fitting of accumulator.
- R (8) Pressurize alternate brake system accumulator with air or nitrogen (Ref. 12-14-11).

LOCKHEED
MAINTENANCE MANUAL

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WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY
HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY
DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL
FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL
AREAS.

THE AFFECTED HYRAULIC SYSTEMS CAN ACCEPT HYDRAULIC
PRESSURE.

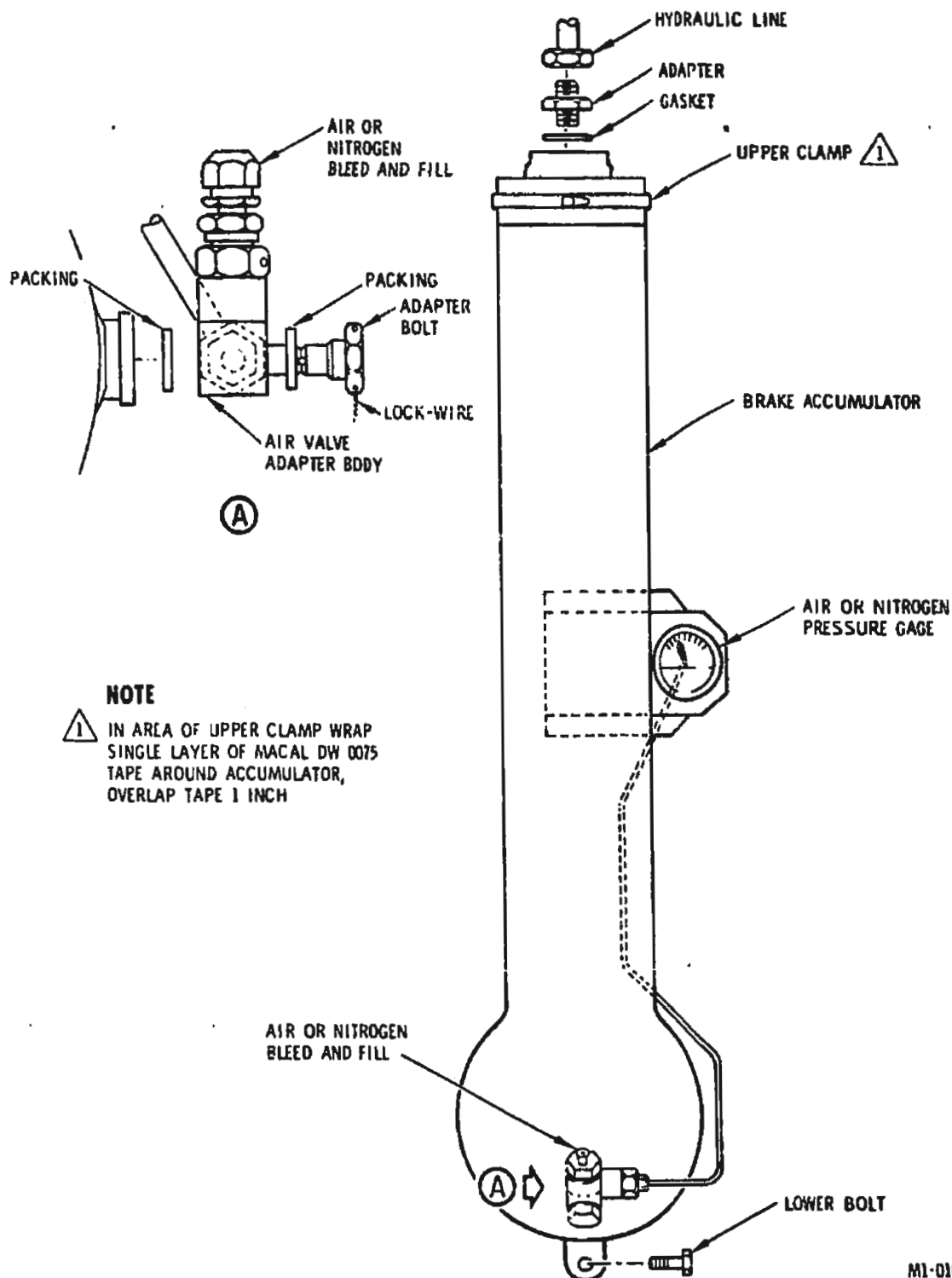
- (9) Turn on electrical power and pressurize hydraulic
system C (Ref. 29-11-00 and 24-00-00).
- (10) Check for air or nitrogen and hydraulic leaks.
- (11) Bleed and replenish brake and hydraulic system (Ref.
29-11-00, and 32-43-00).
- (12) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (13) Turn off electrical power (Ref. 24-00-00).
- (14) Close hydraulic service center access doors.

EFFECTIVITY: ALL

001B

32-43-11
Page 403
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



M1-0102-32-098

R Brake Accumulator, 707 Cubic Inch - Removal and Installation
R Figure 401

R EFFECTIVITY: ALL
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32-43-11
Page 404
Feb 15/78

PRESSURE-ACTUATED HYDRAULIC (SPINDOWN) VALVE REMOVAL AND INSTALLATION

1. Referenced_Procedures

24-00-00 Electrical Power - Maintenance Practices

29-11-00 Hydraulic Power System - Maintenance Practices

2. Removal/Installation

A. Removal

- (1) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (2) Turn on electrical power (Ref. 24-00-00).

R CAUTION: MAIN LANDING GEAR WHEELS MUST BE CHOCKED FORWARD
R AND AFT BEFORE REDUCING BRAKE SYSTEM PRESSURE.

- (3) On pilots center instrument panel, zone 210, position BRAKE SYS SELECT switch to ALT SYS C.
- (4) Pump brake pedals until alternate brake pressure is 0 psi.
- (5) Turn off electrical power (Ref. 24-00-00).
- (6) Rig equipment to catch spilled hydraulic fluid.
- (7) Disconnect valve PRESS, RET, and BRAKE hydraulic lines (Ref. Fig. 401).
- (8) Cap lines and plug valve openings.
- (9) Remove bolts and remove valve.

B. Installation

- (1) Secure valve in position with bolts.
- (2) Remove caps and connect valve PRESS, RET, and BRAKE hydraulic lines.
- (3) Bleed air from hydraulic system C (Ref. 29-11-00).

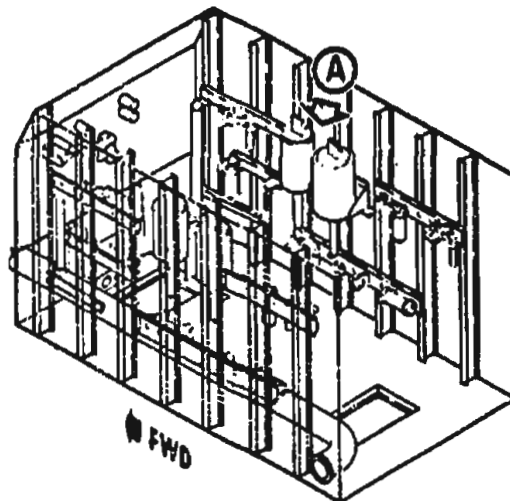
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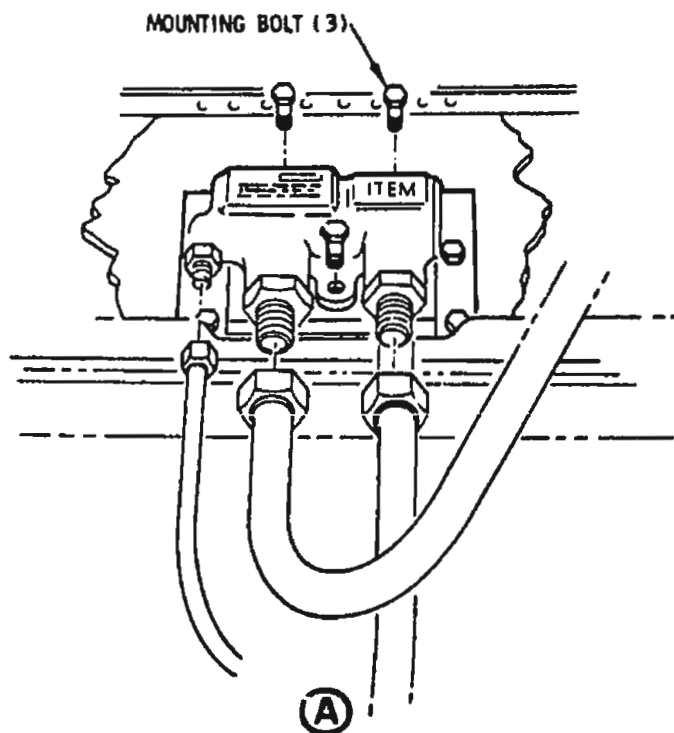
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Page 401
Aug 15/82

LOCKHEED
MAINTENANCE MANUAL



HYDRAULIC SERVICE CENTER
ZONE 147



M1-0001-32-101

Pressure-actuated Hydraulic (Spindown) Valve
Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-43-14
Page 402
Dec 15/80

0016

BRAKE INPUT MECHANISM - REMOVAL AND INSTALLATION1. General

The brake input mechanism, converts push rod input from the rudder pedal toe brakes into cable input at the dual power brake valves in the hydraulic service center. Captains and First Officers system are identical but reversed on opposite sides of the aircraft. This procedure will assist the mechanic in gaining access to the brake input mechanism to facilitate its removal and installation.

2. Equipment and Materials

Bungee, 1/4 inch diameter, four required, or equivalent used to tie cable to structure

3. Referenced Procedures

22-17-16	Stick Shake - Removal and Installation
24-41-00	External Power/Ground Service System - Maintenance Practices
29-11-00	Hydraulic Power System - Maintenance Practices
32-43-00	MLG Brake System - Adjustment and Test
32-43-23	Brake Input Rod - Removal and Installation
34-21-04	Vertical Attitude Reference Gyroscope - Removal and Installation
34-41-03	Inertial Navigation Unit - Removal and Installation
34-43-03	Inertial Sensor Unit - Removal and Installation
R R 34-16-01	Instrument Comparison Monitor - Removal and Installation
34-44-01	Weather Radar Receiver/Transmitter - Removal and Installation

4. Removal/Installation

A. Equipment Removal For Access

0018

EFFECTIVITY: ALL

32-43-18
Page 401
Aug 15/82

LOCKHEED
MAINTENANCE MANUAL

- R (1) On pilots overhead circuit breaker panel (CB1), Zone
R 210, open and tag the following circuit breakers No. 1
and No. 2 system: Navigation Radar RT (D3) and (D2).
- (2) Insure hydraulic pressure is off the aircraft (Ref.
29-11-00).
- (3) In forward electronic service center at forward center
avionics rack, remove the drip shield over the rack
(Fig. 401, View A).
- (4) Remove stick shaker guard (Ref. 22-17-16).
- (5) Remove weather radar receiver/transmitters (Ref.
34-44-01).
- (6) Remove instrument comparison monitor (Ref. 34-16-01).
- R (7) Remove navigation equipment from shelf 1 (Ref.
R 34-21-04, 34-41-03, and 34-43-03).

R **CAUTION:** THE GYRO PLATFORM (SHELF 1) AND VERTICAL SUPPORT
STANCHIONS ARE ALIGNED TO EXTREMELY CLOSE
TOLERANCES DURING AIRCRAFT ASSEMBLY. DO NOT
DISCONNECT OR DISTURB THEIR POSITION.

PLACE A SUPPORT BOARD ON THE GYRO PLATFORM CAPABLE
OF DISTRIBUTING ANY WEIGHT PLACED ON IT TO PROTECT
THE PLATFORM FROM DISTORTION OR DAMAGE..

- (8) Disconnect all aircraft harness connectors from the
shelf 2 wiring harness and remove shelf 2 and the shelf
harness as a unit (Fig. 401, View B).
- (9) Open nose radome (Ref. 53-51-51).
- (10) Remove the forward pressure bulkhead doors, 111BZ for
the Captain, and 111CZ for the First Officer, to allow
limited access to nuts retaining the brake input
mechanism through the lightening holes just aft of
bulkhead (Fig. 401, View C).

B. Removal Of Brake Input Mechanism

- R (1) Disconnect brake input rods from rudder pedal idler
R arms (Fig. 401, View D).
- (2) In hydraulic service center, loosen turnbuckles for all
four brake control cables and reduce cable tension to
zero (Fig. 401, View E).

EFFECTIVITY: ALL

0018

32-43-18
Page 402
May 15/82

LOCKHEED
MAINTENANCE MANUAL

- (3) In FESC, attach bungee cords to all four main brake cables aft of the input mechanism turnbuckles and secure to aircraft structure to prevent cable slack when turnbuckles are disconnected (Fig. 401, View D).
- (4) Disconnect all four cables at the input mechanism turnbuckle.

NOTE: Tag all cables prior to disconnect for ease of identification during installation.

- (5) Remove four nuts and bolts retaining the brake input mechanism to the forward bulkhead of the FESC.

NOTE: Assistance through the radome bulkhead doors will help in capturing the nuts.

- R (6) Remove brake input mechanism from the aircraft.

C. Installation

- (1) Remove short cables from old mechanism and install on new mechanism. Attach each cable in the same relative position as on the old mechanism.
- (2) Position brake input mechanism, with input rod and cables installed, on the forward bulkhead of FESC and fasten with four nuts and bolts.
- (3) Connect all four mechanism cables to the main brake cables and remove bungee cords used to prevent cable slack.

NOTE: Use tags attached during removal to insure proper cable connection. Verify correct routing of each cable for smooth, clear operation before removing tags.

- (4) Connect brake input rod to brake pedal idler arm (Fig. 401, View D).

- R (5) Adjust and test main landing gear brake system (Ref. 32-43-00).

D. Equipment Reinstallation

CAUTION: INSURE ALL TOOLS, EQUIPMENT AND MATERIALS ARE REMOVED FROM AREA FORWARD OF CENTER AVIONICS RACK BEFORE STARTING REINSTALLATION.

EFFECTIVITY: ALL

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32-43-18
Page 403
May 15/82



MAINTENANCE MANUAL

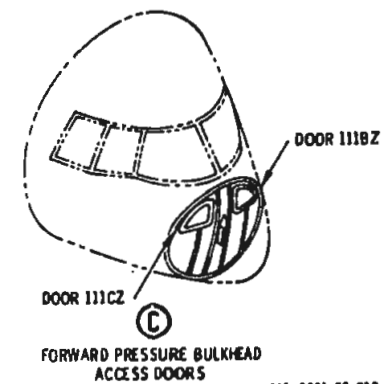
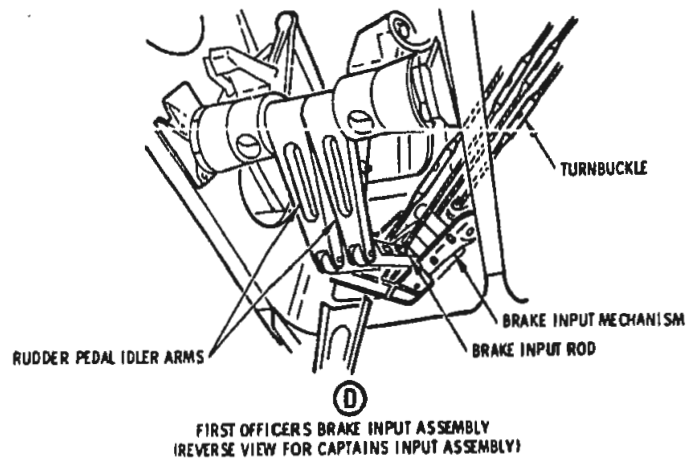
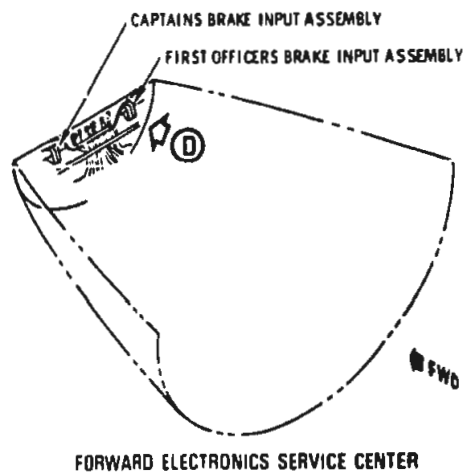
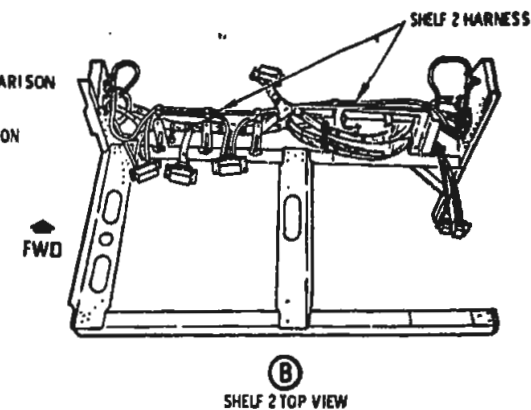
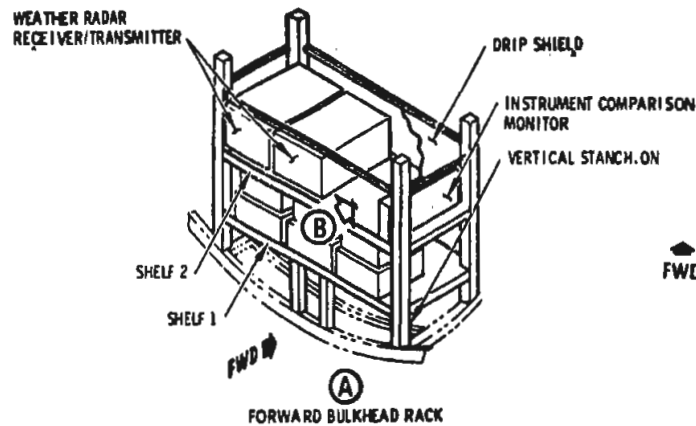
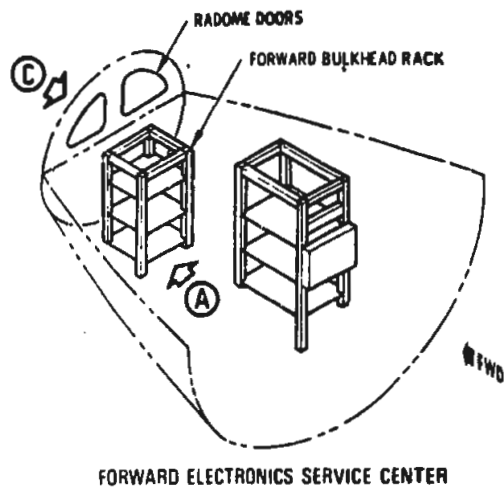
- (1) Install shelf 2 and the shelf harness as a unit and connect all aircraft harness connectors to the shelf 2 wiring harness.
- (2) Remove support board from the gyro platform and reinstall all avionics equipment removed from shelf 1 in Step 4A(7) and test as required.
- R (3) Install weather radar receiver/transmitters on shelf 2 and test as required (Ref. 34-44-01).
- R (4) Install instrument comparison monitor on shelf 2 and test as required (Ref. 34-16-01).
- (5) Install stick shaker guard (Ref. 22-17-16).
- (6) Install drip shield over forward avionics rack in FESC (Fig. 401, View A).
- R (7) Install forward pressure bulkhead doors 111BX and 111CZ.
- R (8) Close nose radome (Ref. 53-51-51).

EFFECTIVITY: ALL

0018

32-43-18

Page 404
May 15/82



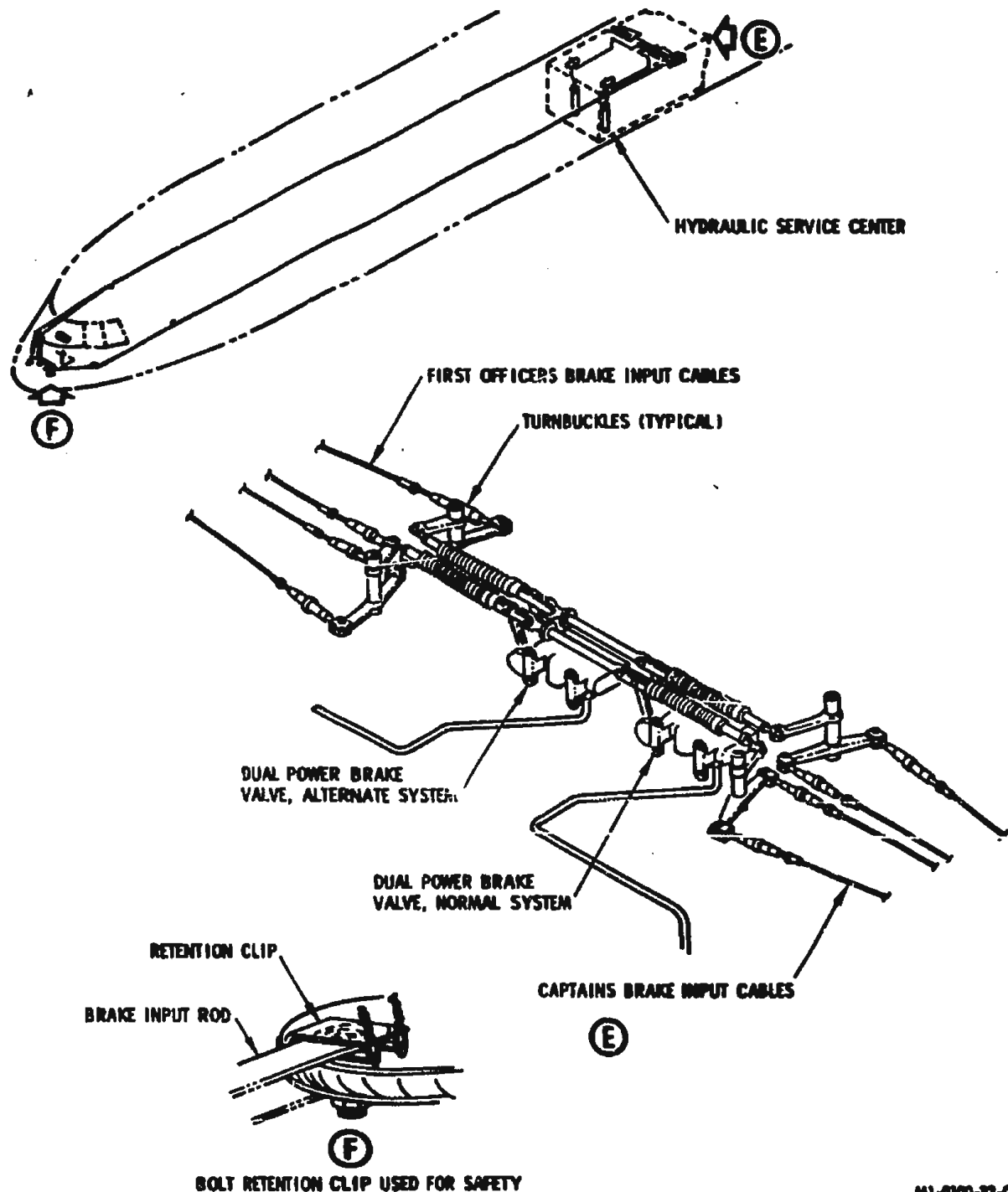
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R Brake Input Mechanism Assembly - Removal and Installation
R Figure 401 (Sheet 1)

EFFECTIVITY: ALL

32-43-18
Page 405/406
May 15/82

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-012

Brake Input Mechanism Assembly - Removal and Installation
Figure 401 (Sheet 2)

EFFECTIVITY: ALL

32-43-18
Page 407/408
Aug 15/78

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MAINTENANCE MANUAL

BRAKE RETURN LINE CHECK VALVE - REMOVAL AND INSTALLATION

1. Equipment and Materials

Container, two-quart capacity, or equivalent

2. Referenced Procedures

29-11-00 Hydraulic Power System - Maintenance Practices

32-43-00 Main Landing Gear Brake System - Maintenance Practices

3. Removal/Installation

A. Removal

- (1) Verify that hydraulic systems B and C pressure is zero (Ref. 29-11-00).
- (2) Pump brake pedals until normal and alternate brake systems pressure is zero.
- (3) Place a container under check valve to catch spilled hydraulic fluid.
- (4) Loosen all three B-nuts connecting hydraulic lines to check valve. Allow hydraulic fluid to drain (Ref. Fig. 401).
- (5) Disconnect B-nuts from check valve.
- (6) Remove nuts and bolts securing check valve to mounting bracket.
- (7) Remove check valve.
- (8) Cap valve ports and plug hydraulic lines.

B. Installation

- (1) Verify that hydraulic systems B and C pressure is zero (Ref. 29-11-00).
- (2) Remove plugs from hydraulic lines and caps from check valve ports.

EFFECTIVITY: ALL

0018

32-43-21
Page 401
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL

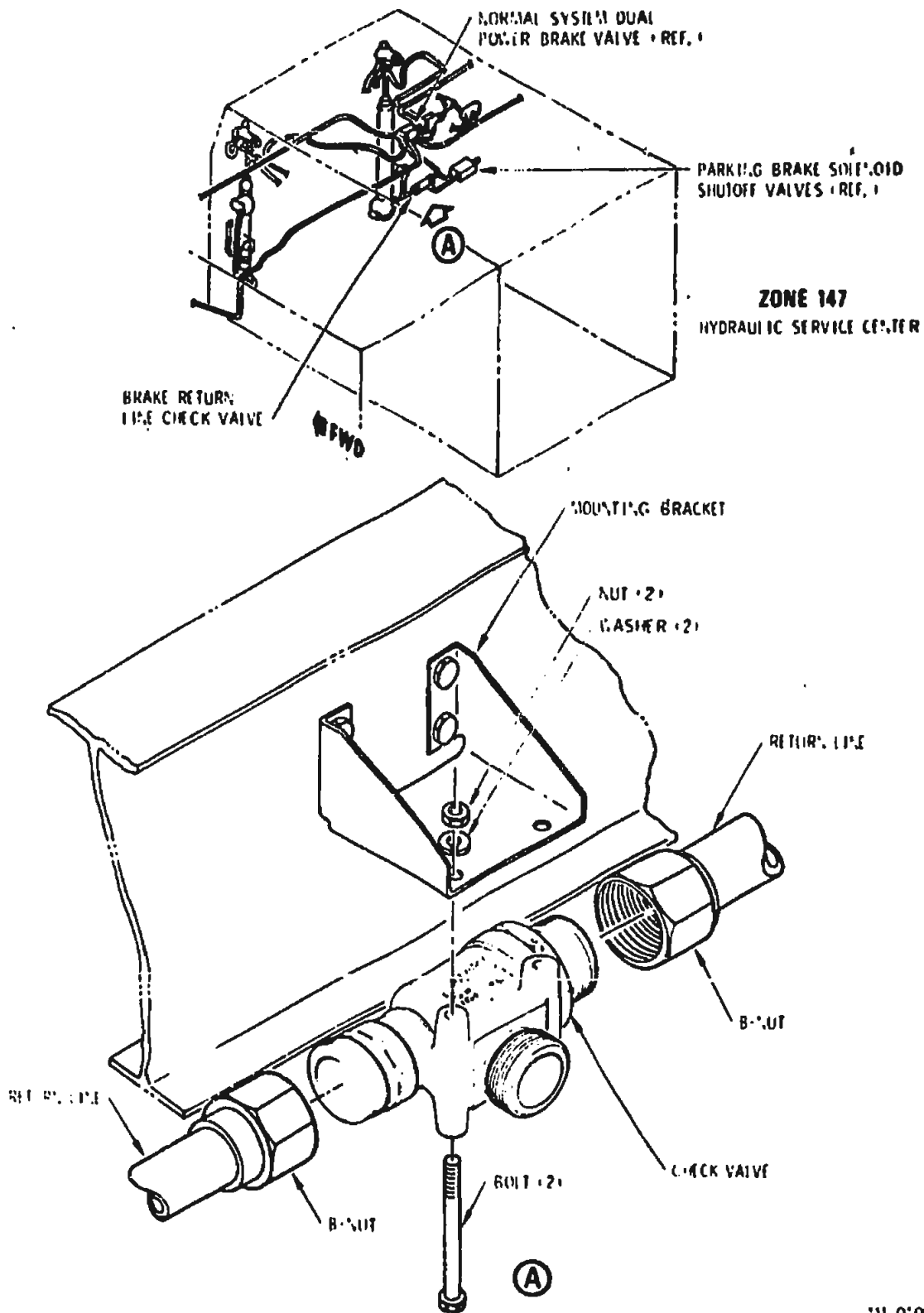
- (3) Secure check valve to mounting bracket using bolts, washers, and nuts.
- (4) Connect hydraulic lines to valve. Tighten B-nuts.
- (5) Bleed normal brake system (Ref. 32-43-00).
- (6) Check all hydraulic connections to valve for leaks.

EFFECTIVITY: ALL

001B

32-43-21
Page 402
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL



311 02-00-32-467

Brake Return Line Check Valve - Removal and Installation
Figure 401

EFFECTIVITY: ALL

001B

32-43-21
Page 403/404
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL

R BRAKE-RETURN-SPRING--REMOVAL-AND-INSTALLATION

R 1. Equipment and Materials

R Cotter pin, MS24665-153, or equivalent

R Grease, MIL-G-23827A, or equivalent

R 2. Referenced Procedure

R 29-11-00 Hydraulic Power System - Maintenance Practices

R 3. Removal/Installation

R A. Removal

R (1) Turn off and tag hydraulic systems B and C (Ref.
R 29-11-00).

R (2) Remove nut securing spring to bracket (Ref. Fig. 401).

R (3) Remove spring-end with bushing from bracket.

R (4) Remove bracket bushing from spring-end. Mark for
R location and set bushing aside.

R (5) Remove nut, washers, and bolt securing spring-end to
R links.

R (6) Remove spring.

R (7) Remove link bushing from spring-end. Mark for location
R and set bushing aside.

R B. Installation

R (1) Insert link bushing in either end of spring (bushing is
R 9/32-inch long).

R (2) Coat bolt with thin film of grease.

R (3) Position spring-end between links and secure in place
R with bolt, washers, and nut. Safety with cotter pin.

R (4) Insert bracket bushing in bracket end of spring
R (bushing is 1/4-inch long).

R (5) Coat bolt with thin film of grease.

R EFFECTIVITY: ALL
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32-43-22
Page 401
May 15/76

LOCKHEED



MAINTENANCE MANUAL

- (6) Position spring-end at bracket and secure in place with bolt, washer, and nut. Safety with cotter pin.

R

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

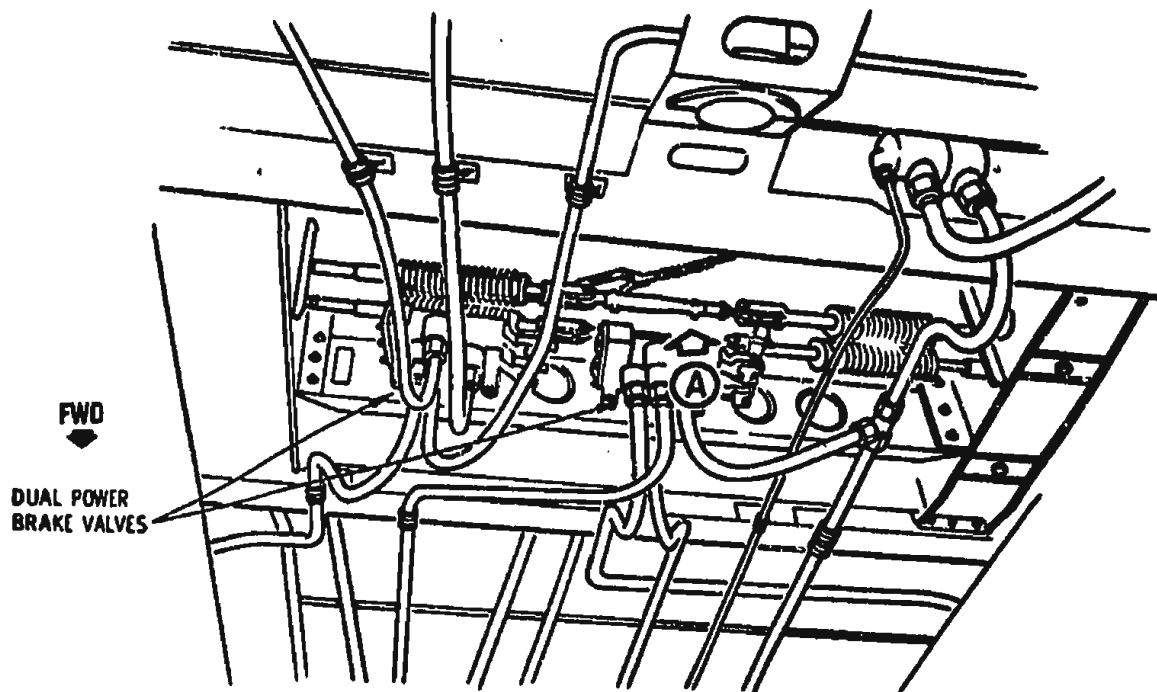
- (7) Remove tags and turn on hydraulic systems B and C pressure (Ref. 29-11-00).
- (8) Depress and release brake pedal at Captains and First Officers positions. Verify that brake pedals return to normal brakes off position.
- (9) Turn off hydraulic power (Ref. 29-11-00).

EFFECTIVITY: ALL

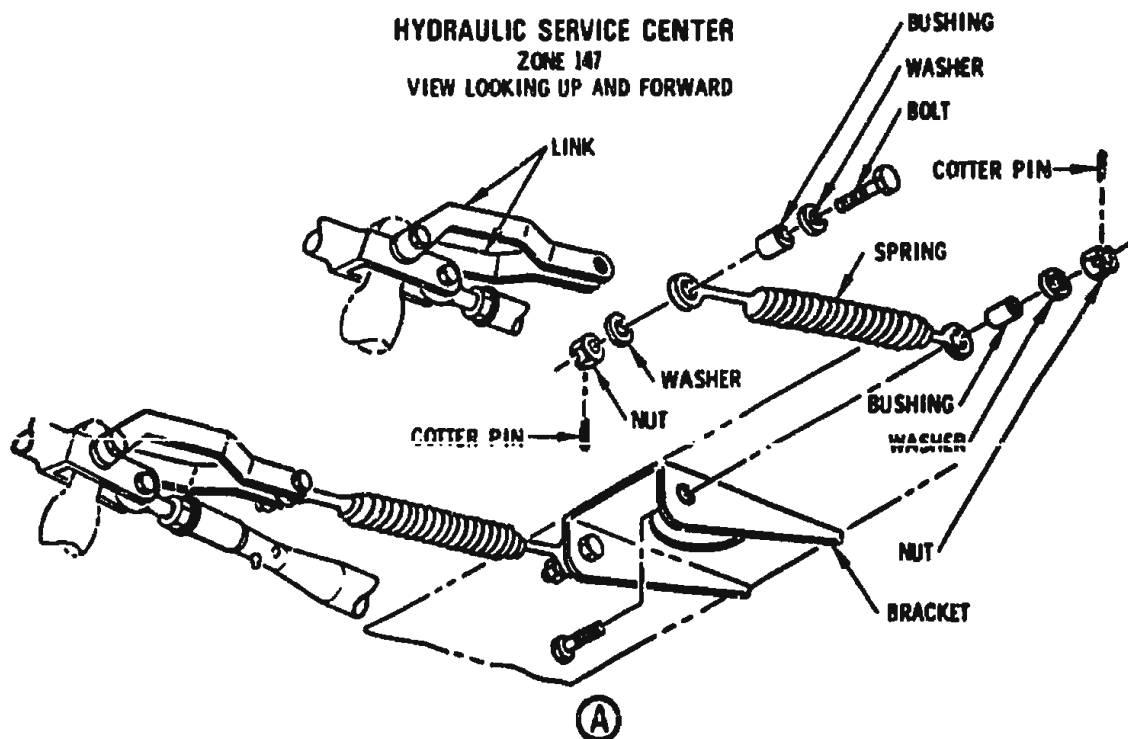
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32-43-22
Page 402
Aug 15/81

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MAINTENANCE MANUAL



HYDRAULIC SERVICE CENTER
ZONE 147
VIEW LOOKING UP AND FORWARD



M1-0100-32-604

Brake Return Spring - Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-43-22
Page 403/404
May 15/76

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MAINTENANCE MANUAL

BRAKE INPUT ROD - REMOVAL AND INSTALLATION

1. General

Two pair of push rods apply forces from the rudder pedal toe brakes to the input mechanism. Captains and First Officers systems are identical but reversed on opposite sides of the aircraft. This procedure will assist the mechanic in gaining access to the brake input rods to facilitate their removal and installation.

2. Equipment and Materials

R Lockwire, QQ-W-390, 0.020-inch diameter, or equivalent

3. Referenced Procedures

32-43-00 Main Landing Gear Brake System - Adjustment and Test

32-43-18 Brake Input Mechanism - Removal and Installation

4. Removal/Installation

A. Removal

(1) Remove brake input mechanism from aircraft (Ref. 32-43-18).

(2) Disconnect brake input rod from brake input mechanism (Ref. Fig. 401).

C. Installation of Brake Input Rod

(1) Connect brake input rod to brake input mechanism.

(2) Install bolt, nut, and retention clip. Safety with lockwire (Ref. Fig. 401).

(3) Reinstall brake input mechanism (Ref. 32-43-18).

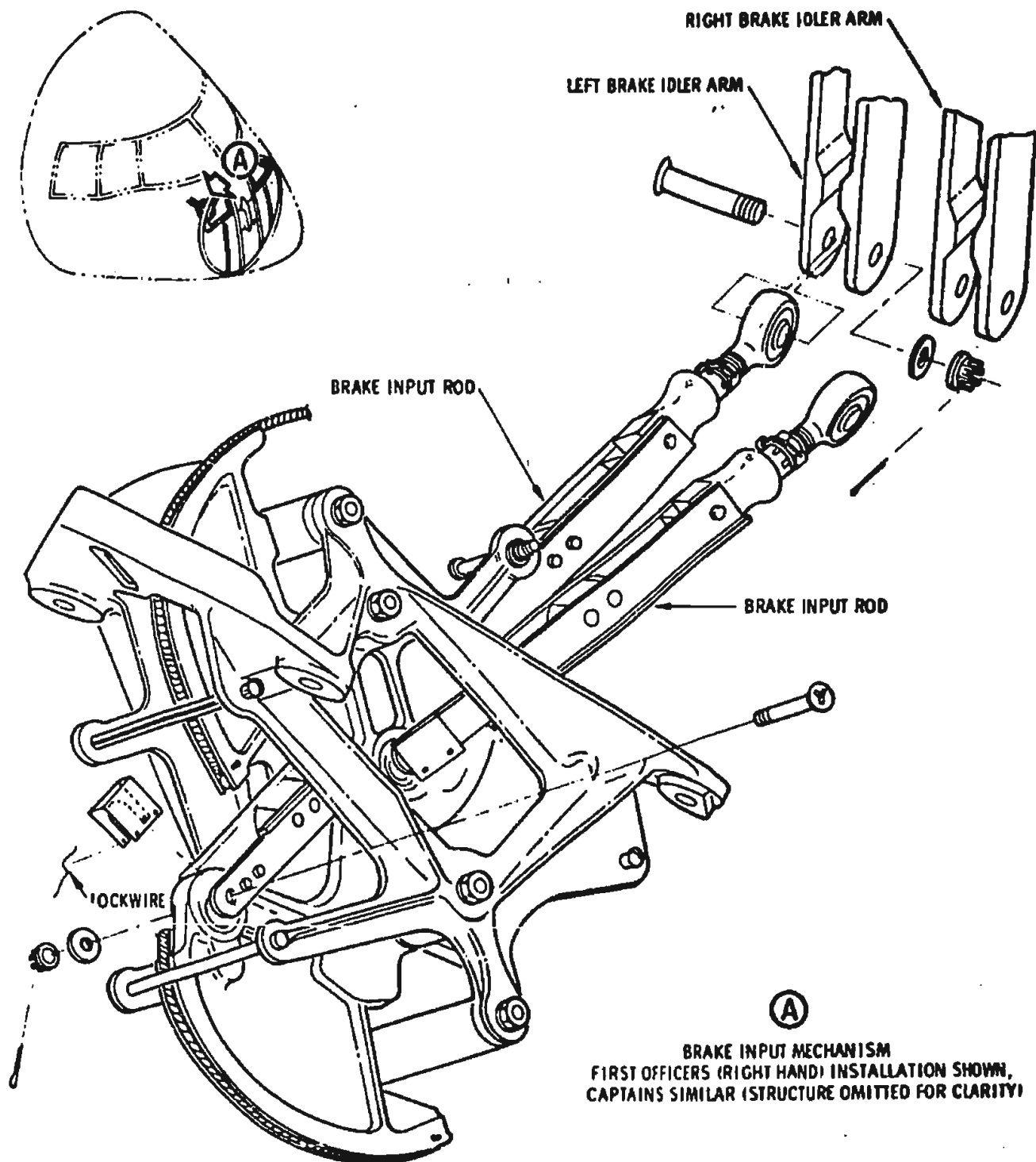
(4) Adjust and test main landing gear brake system (Ref. 32-43-00).

EFFECTIVITY: ALL

0018

32-43-23
Page 401
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL



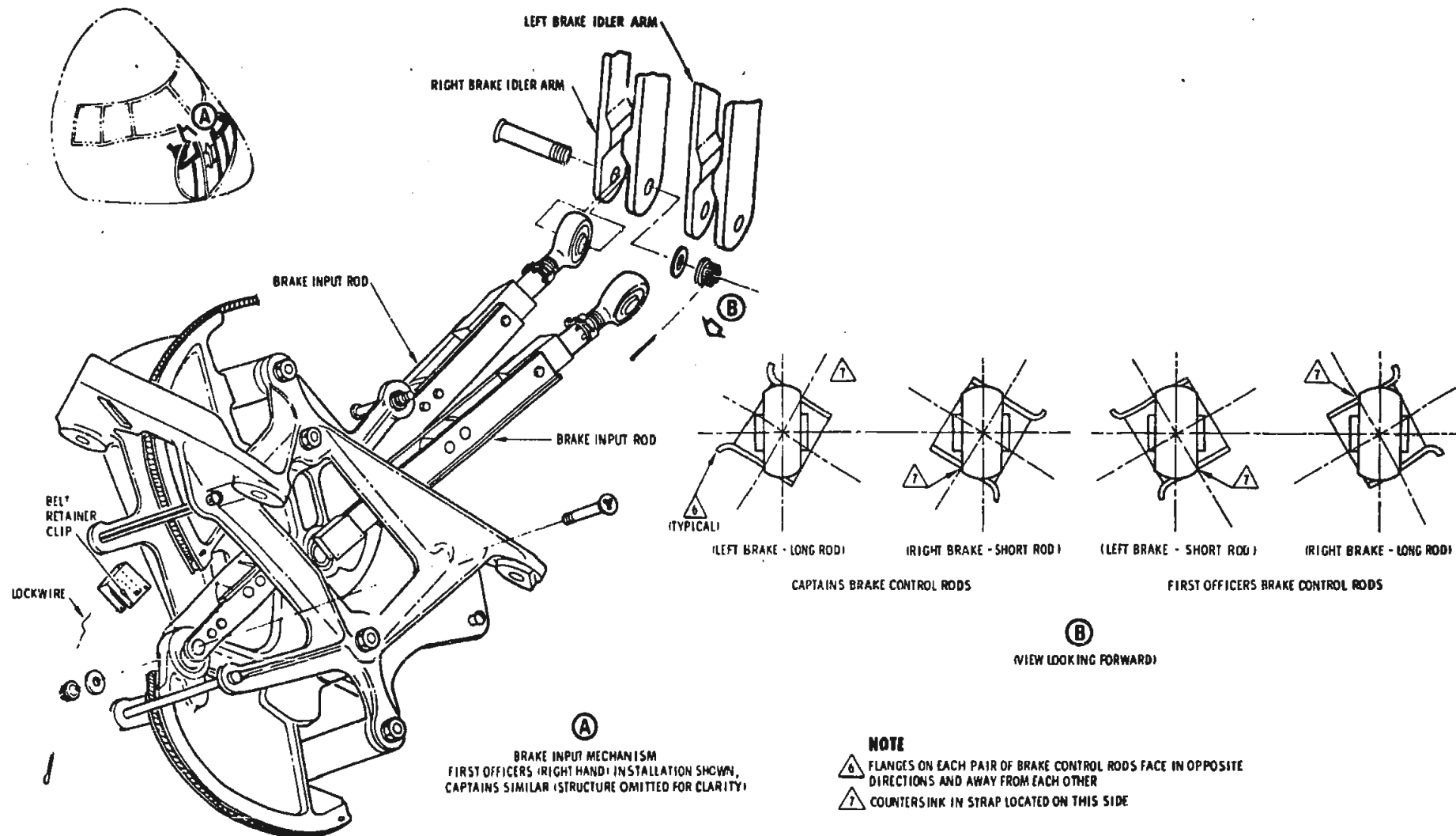
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Brake Input Rod - Removal and Installation
Figure 401

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EFFECTIVITY: 001-031 WITHOUT S832-153

32-43-23
Page 402
May 15/82



M1-0000-32-983

Brake Input Rod - Removal and Installation
Figure 401

EFFECTIVITY: 001-031 WITH S832-153 AND 032-999

32-43-23
Page 403/404
May 15/82

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ANTISKID CONTROL SYSTEM - DESCRIPTION AND OPERATION1. General

R The antiskid control system is a closed-loop system which provides individual brake torque control of each main landing gear (MLG) wheel. The antiskid control system prevents wheel skidding by limiting application of brake pressure without requiring brake pedal modulation by the pilot. Antiskid control is provided for both normal and alternate brake operation.

Antiskid control system major components (Ref. Fig. 1) are; a wheel speed sensor in each end of each axle, zones 731 and 741, an electronic control unit (ECU) in the mid electrical service center, zone 139, two brake control modules in each wing bat section, zones 541 and 641, and a flight station antiskid control monitor panel in the left overhead panel, zone 211. Associated switches, wiring, and an antiskid failure indicator on the pilots annunciator panel, zone 210, complete the system.

2. Operation

Power for antiskid system operation (Ref. Fig. 2) is basically 115-volts, 400 Hz, single-phase. Power is supplied through the landing gear control and flight station antiskid control monitor to the ECU power supply. Aircraft DC power is used only to open the parking brake valves for antiskid hydraulic operation and to power indicator lights.

Wheel speed signals (Ref. Fig. 3) generated by the wheel speed sensor are sent to the ECU. The ECU senses change in wheel speed in order to detect departures from normal deceleration. These departures from normal are treated as skids or approaching skids. Correction signals are sent to antiskid control valves in the brake control module to reduce brake pressure. The correction signal is reduced when the wheel begins to return to normal speed. Flight station control is maintained through the flight station antiskid control monitor.

3. Wheel Speed Sensor and Exciter RingA. Description and Operation

The wheel speed sensor (Ref. Fig. 4) is mounted stationary inside the end of the axle. It consists of a coil with a permanent magnet core and four equally spaced poles on its periphery. The exciter ring is attached to the wheel hubcap and is positioned to rotate in close proximity to the poles

EFFECTIVITY: ALL

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MAINTENANCE MANUAL

FLIGHT STATION
CONTROL MONITOR
ONE IN PILOTS
OVERHEAD PANEL

ANTISKID FAILURE
INDICATOR ONE
IN PILOTS
ANNUNCIATOR
PANEL

ELECTRONIC CONTROL UNIT (ECU)
(ONE IN MID ELECTRICAL SERVICE CENTER)

BRAKE CONTROL MODULE
(ONE IN EACH MLG WELL)

WHEEL SPEED SENSOR
(ONE IN EACH END OF EACH AXLE)

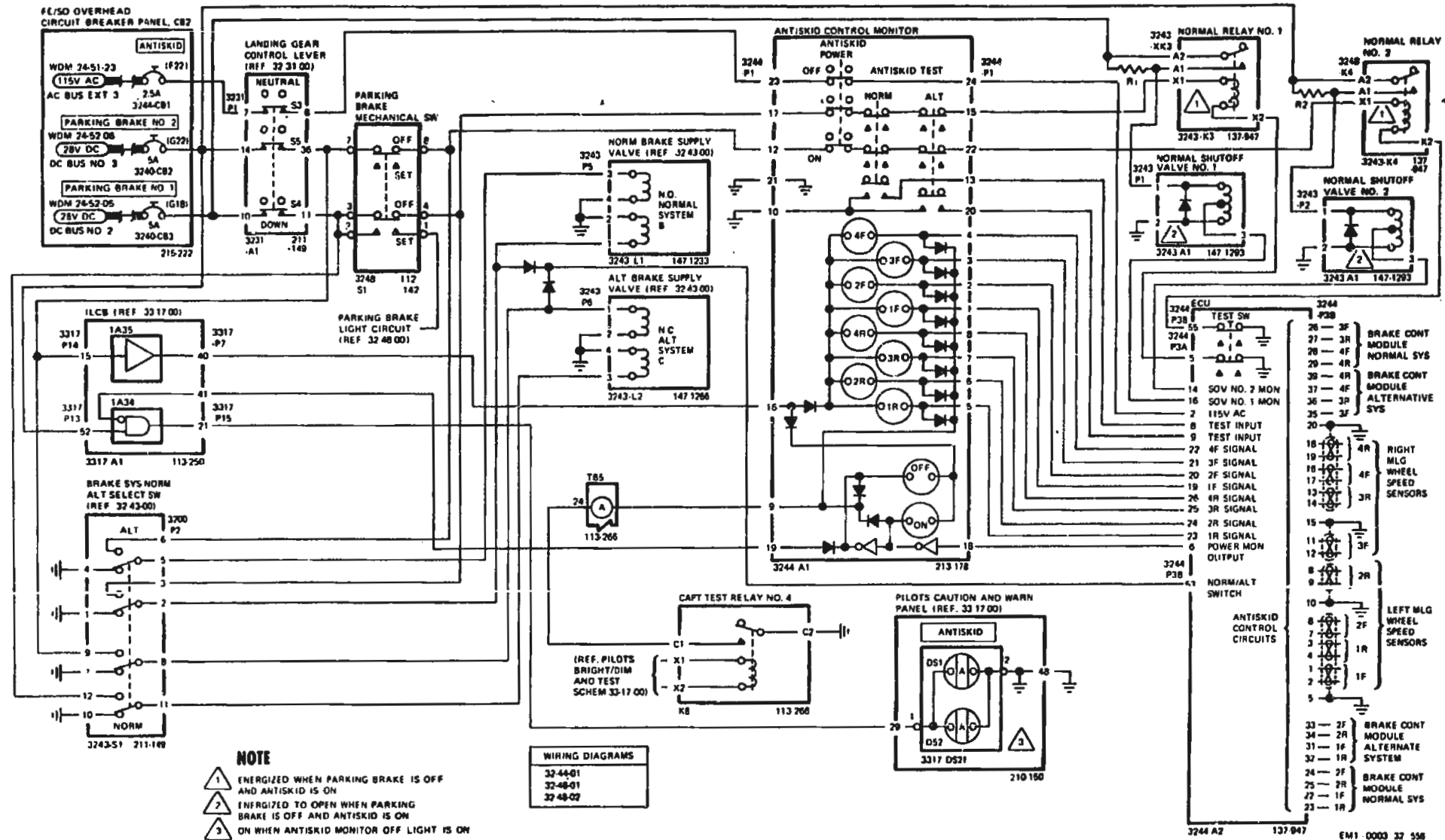
Antiskid Control System Major Component Location
Figure 1

EFFECTIVITY: ALL

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32-44-00
Page 2
Dec 1/71

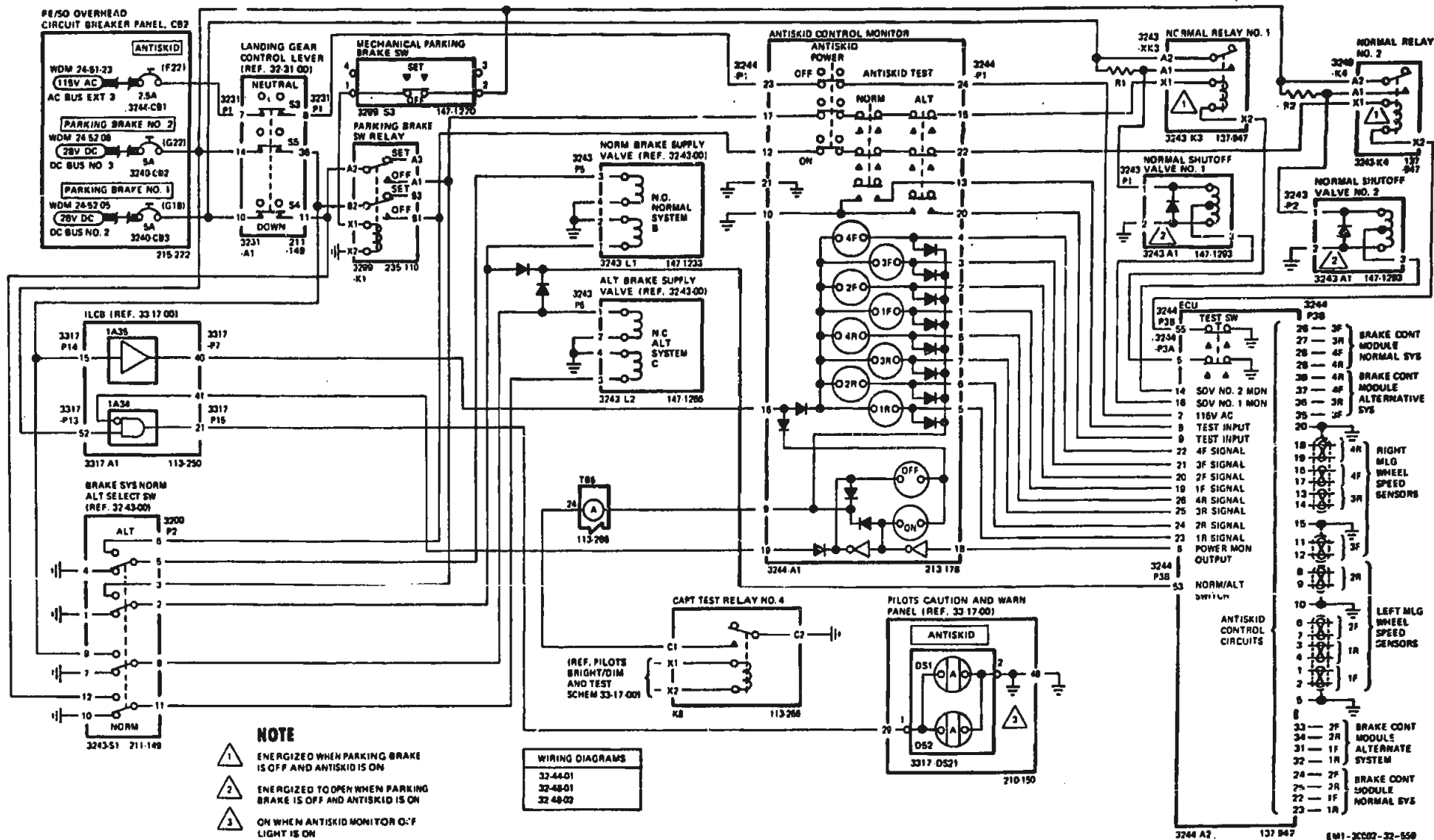


Antiskid Control Power Electrical Schematic
Figure 2

EFFECTIVITY: 001-014

32-44-00
Page 3/4
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL



Antiskid Control Power Electrical Schematic
Figure 2

EFFECTIVITY: 015-031 WITHOUT SB32-179

32-44-00
Page 5/6
Nov 15/82



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32-44-00
Page 7/8
Nov 15/82



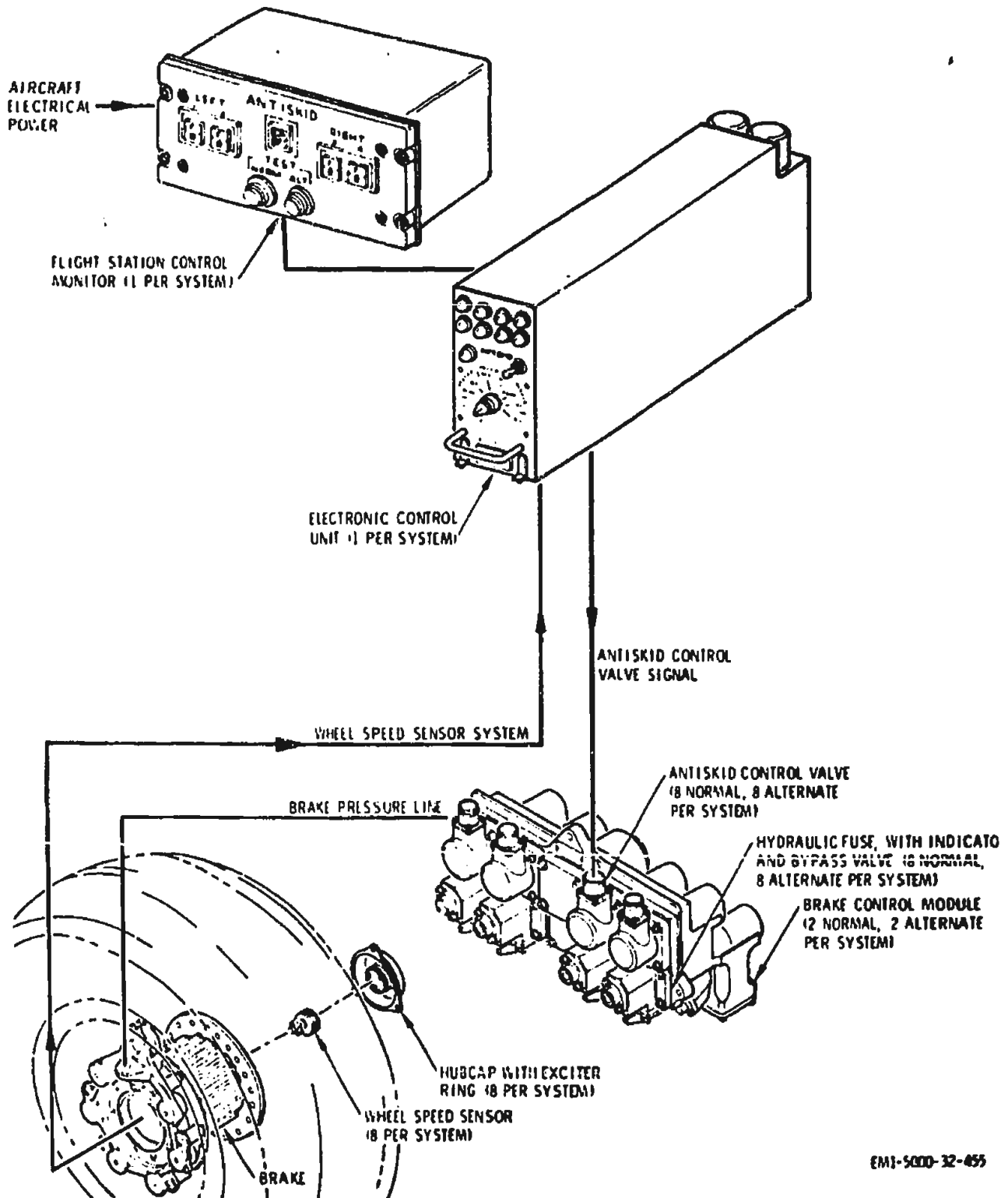
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32-44-00
Page 9/10
Nov 15/86

LOCKHEED
MAINTENANCE MANUAL



EM1-5000-32-455

Antiskid Control System Signal Flow
Figure 3



of the sensor coil. The ring is made of soft iron and contains 48 internal teeth. Rotation of the exciter ring around the sensor coil causes a fluctuation of the coil magnetic field. This results in an ac output signal from the coil that has a frequency of 48 cycles per wheel revolution (5.25 Hz per mile per hour). The sensor signal is then sent to the ECU where it is monitored for impending wheel skids.

4. System Electronic Control Unit (ECU)

A. Description

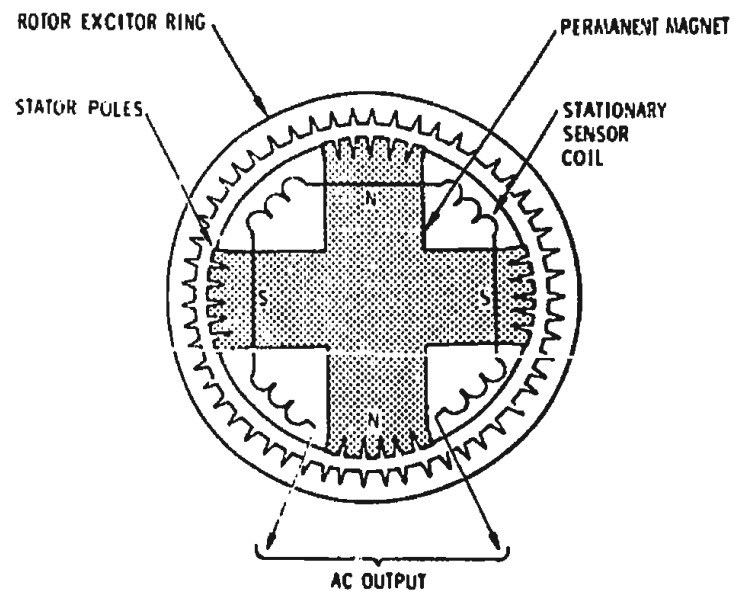
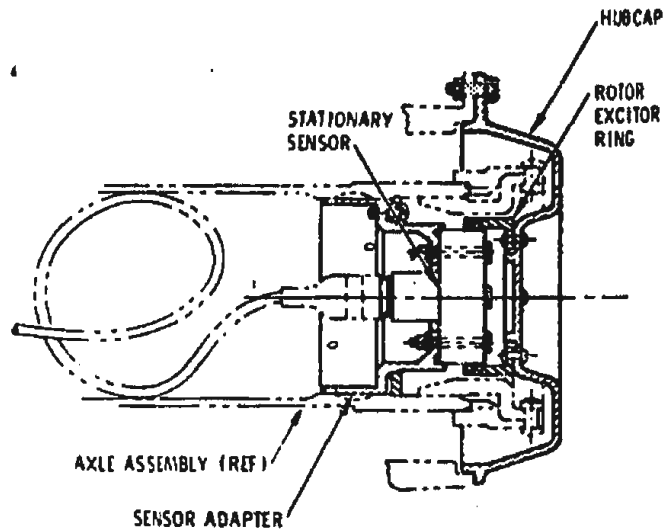
The ECU front panel (Ref. Fig. 5) contains a rotary selector switch, a test switch, and nine indicator lights. These components are related to the built-in test equipment (BITE) feature. The ECU contains analog and digital circuitry to provide antiskid control and BITE functions. Portions of the circuitry are contained on 11 plug-in printed circuit boards. Eight identical boards provide independent antiskid control for each of the eight main wheels. Two other identical boards provide system testing, failure monitoring, and touchdown locked-wheel protection functions. One board provides component testing (wheel speed sensors and control valves) for all main wheels. A power supply is provided in the ECU which operates from 115-volt, 400 Hz, single-phase aircraft power. The power supply provides both regulated and unregulated voltages for operation of the antiskid system.

B. Operation

The ECU receives a variable frequency signal from the wheel speed sensor. This signal is converted to a dc voltage that is proportional to wheel speed. The rate of dc voltage change is computed and interpreted in terms of rate of velocity of wheel speed change. When pilot-applied brake pressure is excessive, the wheel begins to skid. The ECU senses wheel velocity change, and when it exceeds a preset threshold, a control signal is sent to the hydraulic module antiskid control valve to reduce brake pressure, which allows the wheel to recover from the skid. The ECU control reduces brake pressure as necessary to maintain the best braking for any runway condition.

Failures which cause the antiskid system to become inoperative are continuously monitored. These failures are indicated on the pilots annunciator panel, zone 211, and flight station antiskid control monitor.

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Wheel Speed Sensor
Figure 4

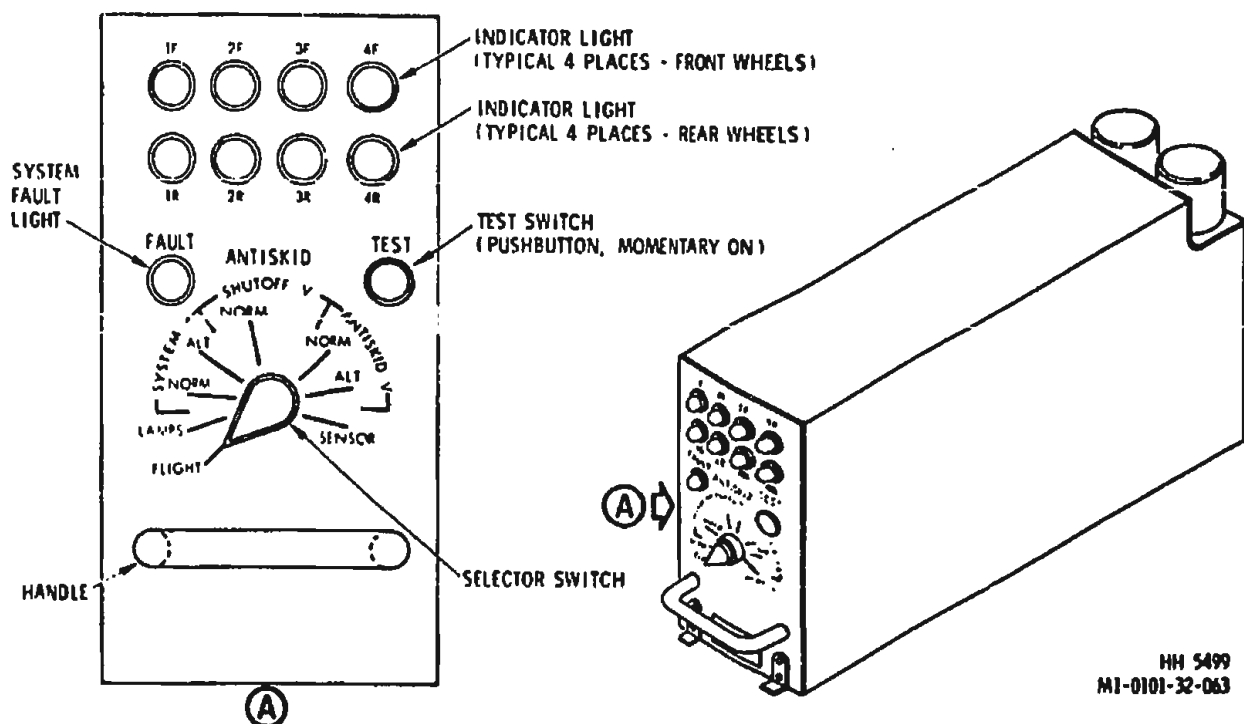
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32-44-00
Page 13
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL

A functional block diagram of the antiskid control system, for one wheel, is shown in Fig. 6. Antiskid operation is identical for each wheel, therefore, the following explanation is for one wheel only. Antiskid control is performed by three control loops; minor, major, and auxiliary. The wheel speed signal is converted to a dc signal proportional to the output frequency of the wheel speed sensor. The dc signal is applied to the detector circuits of the three control loops and to the locked wheel arming circuits. The condition or magnitude of the signal determines which control loop initially responds. The major loop assumes control unless either the minor loop or auxiliary loop overrides it. Signals from any of the three control loops are applied through the voltage amplifier to the valve current drivers to develop control signals of proper current magnitude to regulate the antiskid control valves. Each of the brake systems, normal and alternate, has a valve current driver to ensure ample current to operate the antiskid control valves. A control signal is applied to both antiskid control valves simultaneously, however, only the selected brake system has hydraulic pressure applied to the antiskid control valve.

(1) Minor Control Loop



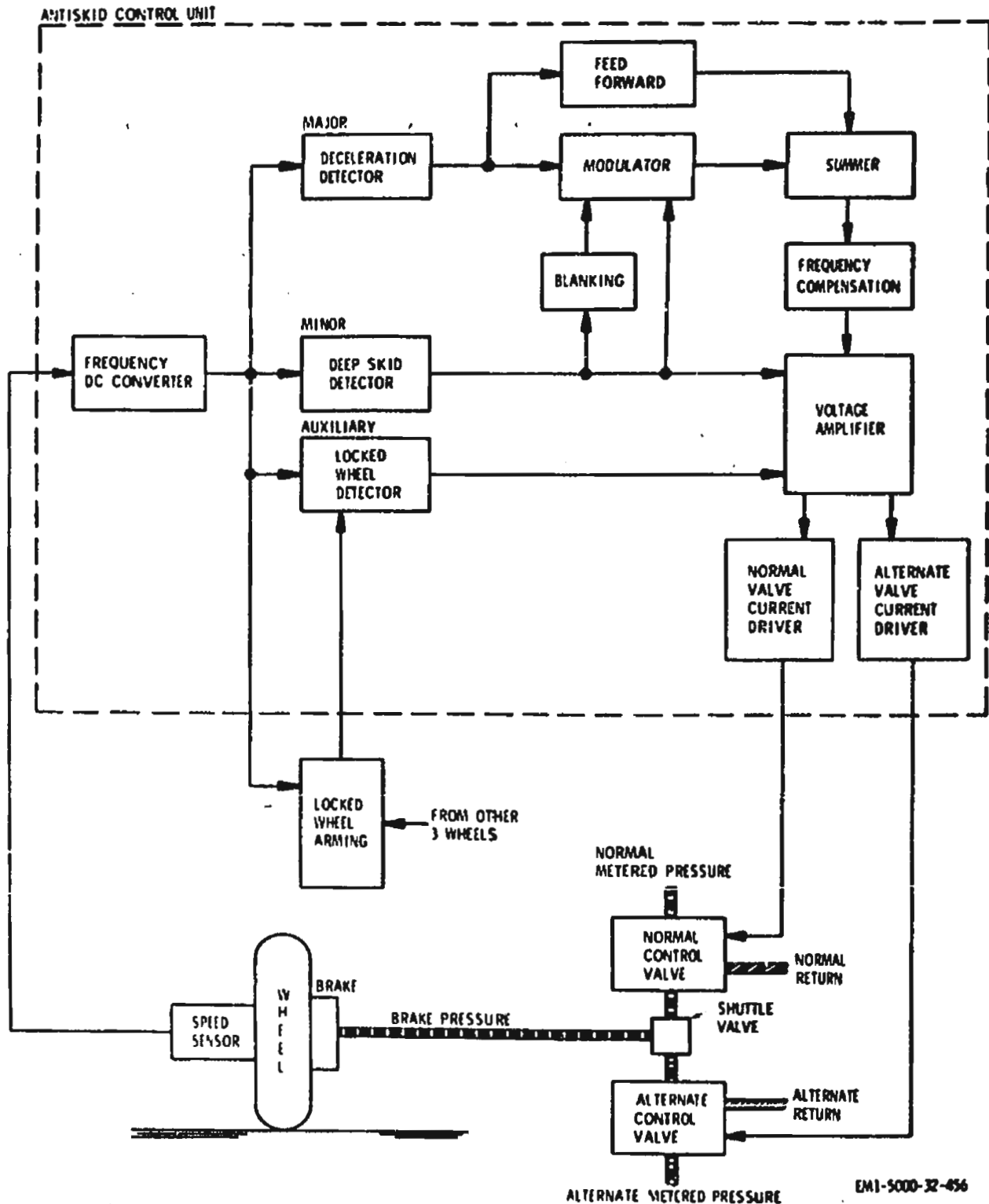
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Electronic Control Unit
Figure 5

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32-44-00
Page 14
Nov 15/82

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MAINTENANCE MANUAL



Antiskid Control System Block Diagram
Figure 6

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32-44-00
 Page 15
 Nov 15/82



The minor control loop (Ref. Fig. 7) consists of a frequency to dc voltage converter, a deep skid detector, a voltage amplifier, two valve current drivers, and two antiskid control valves. The frequency to dc voltage converter, voltage amplifier, valve current drivers, and antiskid control valves are common to all three control loops. Operation and function of these units are the same for all three loops.

(a) Frequency to DC Voltage Converter

The wheel speed sensor ac signal is fed to the frequency to dc voltage converter where it is changed to a dc voltage proportional to the wheel speed in the ratio of 0.04 volt per mile per hour. The dc output voltage of the converter is simultaneously applied to the minor, major, and auxiliary control loops. Loop responses are determined by the amplitude of the dc signal. When the wheel is in a deep impending skid condition, the minor control loop makes the initial response.

(b) Deep Skid Detector

The deep skid detector monitors the wheel speed signal for deep impending wheel skids. A speed memory circuit and a threshold switching circuit are contained within the deep skid detector. The deep skid detector comes into operation when the first impending skid results in a sudden wheel speed decrease in excess of 15 mph. When the decrease in wheel speed exceeds 15 mph, the deep skid detector has an output. This excessive decrease in wheel speed occurs mainly on slippery runways or with light wheel loads. The deep skid detector output is sent to the voltage amplifier, and to the initialization and adaptive deceleration reference (ADR) circuits in the major control loop. An input to the voltage amplifier from the deep skid detector results in a full release signal to the antiskid control valve.

The signal from the deep skid detector to the initialization and ADR circuits initiates major control loop operation. The major control loop assumes control after full release of brake pressure and reapplies pressure at the correct level to maintain best braking control. The minor control loop is subordinated to a back-up role and its deep skid detector has no output during the

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32-44-00

Page 16
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL

remainder of the stop unless the runway surface suddenly becomes more slippery, resulting in a deceleration condition that exceeds the limits of the major control loop.

(c) Voltage Amplifier

The voltage amplifier receives signals from all three control loops. The function of the voltage amplifier is to increase the input signal sufficiently to drive the valve current drivers. The output characteristic of the voltage amplifier is determined by the greatest of the three input signals from the loops. The magnitude of the output signal is directly proportional to the greatest input signal.

(d) Valve Current Driver

The voltage amplifier output signal is applied to each normal and alternate valve current driver. Separate valve current drivers are used in order to be able to isolate failures to the normal or alternate antiskid control valve circuits. Current drivers are used because the antiskid control valves are current-operated devices. The valve current drivers are current limited to protect against short-circuit damage. Valve current driver output also drives the brake release light circuit for the particular wheel.

(2) Major Control Loop

The major control loop (Ref. Fig. 8) maintains control over brake pressure proportional to wheel speed deceleration or acceleration rate. In a braking stop with no impending skid conditions encountered, the major control loop will be the only control loop responding. In addition to circuits common to all three loops, the major control loop contains the following circuits:

Deceleration detector

Modulator circuits:

Initialization (Initiates major loop when a deep impending skid is detected)

Integrator

Adaptive deceleration reference (ADR)

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EFFECTIVITY: ALL

32-44-00
Page 17
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL

Analogue signal switch

Feed forward

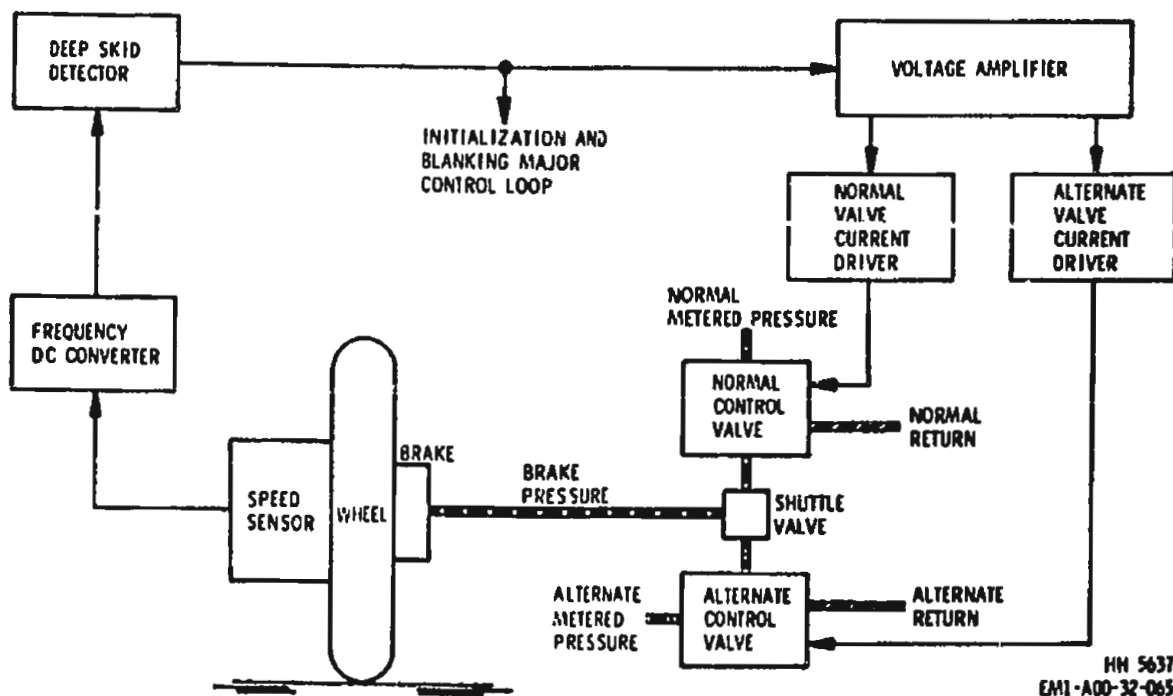
Summer

Frequency compensation

(a) Deceleration Detector

The deceleration detector monitors the dc wheel speed signal from the frequency to dc converter, producing an output signal that is a measure of the deceleration or acceleration rate of the wheel speed. The deceleration detector output controls the level of brake pressure for wheel speed changes below 15 mph. Deceleration detector input to the modulator is overridden by an input from the deep skid detector when the wheel speed change exceeds 15 mph, constituting a deep impending skid. Deceleration detector output is applied to the modulator and feed forward circuits.

(b) Modulator Circuits



ECU Minor Control Loop Block Diagram
Figure 7

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EFFECTIVITY: ALL

32-44-00

Page 18
Nov 15/82

LOCKHEED



MAINTENANCE MANUAL

The modulator responds to signals from the deceleration detector and deep skid detector. Contained in the modulator are the ADR, initialization, analog switch, and integrator circuits. The modulator circuits provide adaptability and high system operating efficiency by developing signals that control the level of brake pressure and the level at which it is reapplied after an impending skid has been corrected. Modulator circuits maintain average brake pressure level to maintain optimum braking control.

During the first impending skid cycle, the integrator is charged by the deceleration detector or the initialization circuit, depending upon the severity of the impending skid. This results in a dc signal output that is applied to the summer. The level of the dc signal is determined by the duration of the impending skid. On a dry runway the impending skid is of short duration, while on a wet runway it is of a longer duration. The initialization circuits respond to the width of the signal from the deep skid detector in the minor loop. This signal is applied through the analog switch to the integrator. The level to which the integrator is charged is determined by the duration of the signal from the deep skid detector. The resultant pressure applied to the brake is inversely proportional to the magnitude of the signal output of the integrator. A high level signal from the integrator results in a low brake pressure, and conversely a low level signal results in a higher brake pressure. A slippery runway results in a longer duration impending skid and a higher charge on the integrator. A runway which is not slippery results in a shorter duration impending skid and a lower charge on the integrator.

The ADR circuit receives and processes signals from the deceleration detector, deep skid detector, and integrator circuits. The ADR adapts to a deceleration rate according to how slippery the runway is. When a wheel encounters a deep impending skid, the deep skid detector sends a signal to the ADR circuit, indicating that the runway is slippery and a lower deceleration reference must be established. The ADR circuit responds by lowering the deceleration reference. The deceleration reference then returns toward a deceleration rate of 25 ft/sec² to the point where

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32-44-00

Page 19
Nov 15/82



the integrator sends a brake release signal. At this point the brake cannot take any additional pressure for the runway condition, and the pressure must be lowered to prevent a skid. The ADR is reset to the new condition. The brake release signal from the integrator is also fed back to the ADR. The ADR then changes the deceleration reference to correspond with the runway condition. This is accomplished by comparison of the actual wheel deceleration rate, as measured by the deceleration detector, and the ADR, as determined by the signal fed back from the integrator.

The signals from the deceleration, ADR, deep skid detector, and initialization circuits are summed in a summing network and the resultant signal is applied through the analog switch to the integrator. The integrator determines the rate of change of brake pressure in direction and magnitude to correct the deceleration error. The rate of pressure change in direction is determined by the sign (positive or negative) of the error signal. The antiskid constantly adapts the reference deceleration rate to the runway conditions.

(c) Feed Forward Circuit

The feed forward circuit is a lead network which provides an advance signal from the deceleration detector through the summer, frequency compensation network, and voltage amplifier to the antiskid control valves to speed up antiskid system response.

(d) Summer Circuit

The feed forward signal and the slower responding modulator signal are summed in the summer, and the resulting valve drive signal is frequency compensated, amplified, and sent to the antiskid control valves.

(e) Frequency Compensation Network

The signal from the summer is passed through a frequency compensation network that increases the amplitude of the valve drive signal to compensate for a loss in frequency response that occurs in the brake hydraulic system above 7 Hz. This network extends the overall frequency response of



MAINTENANCE MANUAL

the system sufficiently to allow stable antiskid control action in the range of 15 Hz. Operation in this range provides smooth braking without exciting the landing gear which has a natural frequency of 5.5 to 8 Hz.

(3) Auxiliary Control Loop

The auxiliary control loop (Ref. Fig. 9), functions to prevent a locked wheel caused by hydroplaning under extremely slippery runway conditions. Besides the control circuits common to the other two loops (minor and major), the auxiliary control loop includes the locked wheel arming circuit, and locked wheel detector.

(a) Locked Wheel Arming Circuit

There are two wheel arming circuits, one to control the four outboard wheels and one to control the four inboard wheels. The locked wheel arming circuit receives speed input signals from all four associated wheels through the frequency to dc converter of each wheel.

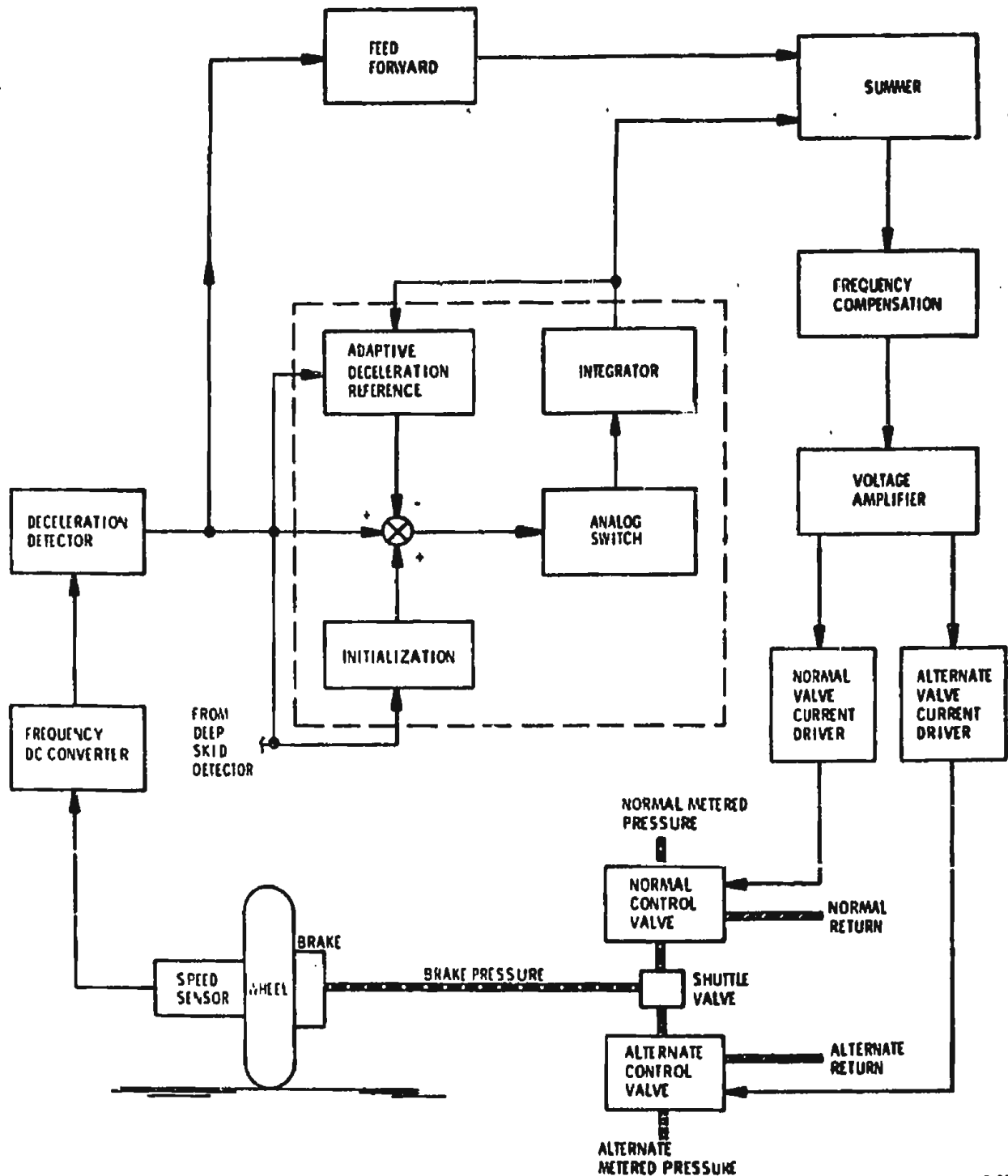
The locked wheel arming circuit contains a speed memory circuit that is monitored by a threshold switching circuit. The threshold switching circuit actuates on an input of 23 mph from any one of the four wheels associated with that circuit. The output signal from the locked wheel arming circuit is applied simultaneously to the four locked wheel detectors (associated with the four wheels) at all speeds above 23 mph.

The memory circuit has a linear rundown time corresponding to 27 ft/sec^2 . As an example, when all speed input signals are removed simultaneously at 130 mph, the threshold switching circuit maintains an arming signal output for another 6 seconds. The memory circuit protects against prolonged locked wheel conditions that may occur due to hydroplaning conditions.

(b) Locked Wheel Detector

The locked wheel detector has a switching threshold of 10 mph. As the wheel spins up though 10 mph at touchdown, the locked wheel detector switches off the release signals from locked wheel arming to the antiskid valves. This allows brake pressure to be applied to begin the braking stop.

LOCKHEED
MAINTENANCE MANUAL



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ECU Major Control Loop Block Diagram
Figure 8

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32-44-00
Page 22
Nov 15/82



The signals from the four wheels provide an aircraft speed reference that keeps the locked wheel arming energized down to 23 mph, where it drops out. When the speed of any wheel drops below 10 mph while the aircraft speed is above 23 mph, that wheel will have its brake pressure released. The 13 mph differential between 23 mph locked wheel arming of aircraft speed and the 10 mph wheel speed of the wheel speed detector circuits is maintained so that no false pressure-release signals occurs during taxi or parking operations.

5. Hydraulic Brake Control Module

A. Description

There are four hydraulic brake control modules in the antiskid system. Two modules are associated with each MLG, one in each normal and alternate brake system. Each module (Ref. Fig. 10) contains four antiskid control valves, four hydraulic line fuses with status indicators and manual bypass control levers, four brake line filters with external differential pressure indicators, and one inlet filter. The normal brake system has two paralleled solenoid shutoff valves in the return line. These are all single cartridge type units for ease of maintenance.

B. Operation

The hydraulic brake control module antiskid control valve is a two-stage three-way pressure control servo valve. It is controlled by current signals from the ECU. Pressure to the antiskid valve comes from the pilots foot-controlled dual power brake valve. With no electrical signal impressed on the first stage, outlet pressure to the brake is the same as the pilots metered inlet pressure. With an electrical signal applied, the outlet pressure is reduced from the inlet pressure by an amount that is in direct proportion to the applied current.

When a skid condition begins, an electrical signal is sent by the ECU to the antiskid control valve torque motor (Ref. Fig. 11) which activates the flapper, restricting flow through the right nozzle. Restriction of nozzle flow causes an increase in pressure in chamber A and moves the spool downward against bias spring tension. Brake hydraulic flow through chamber B to the brakes is restricted. Movement of the spool downward bears against the connector pin which in turn moves the shuttle downward allowing brake hydraulic pressure to be bled off through chamber C to hydraulic

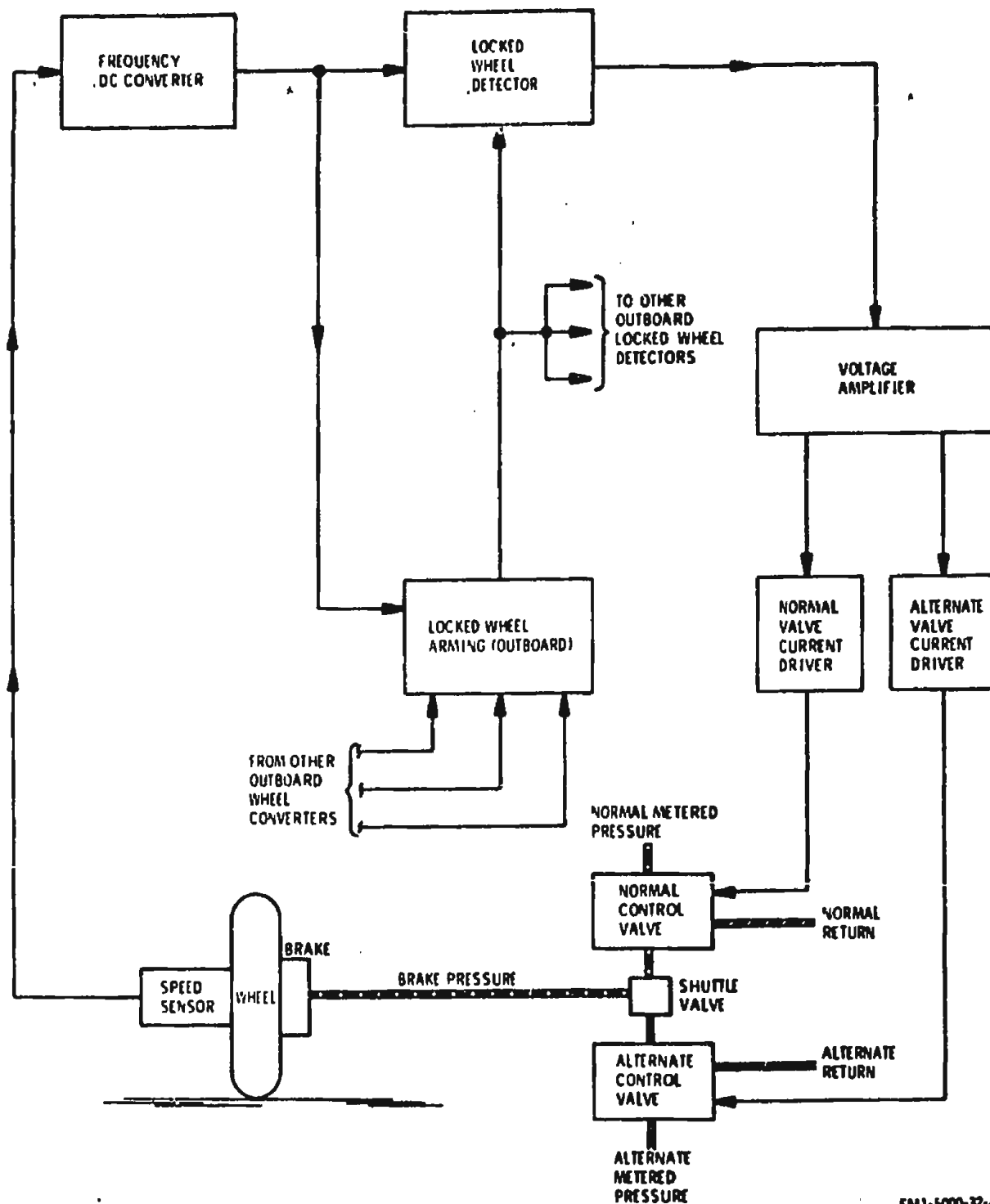
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Page 23
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL



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ECU Auxiliary Control Loop Block Diagram
Figure 9

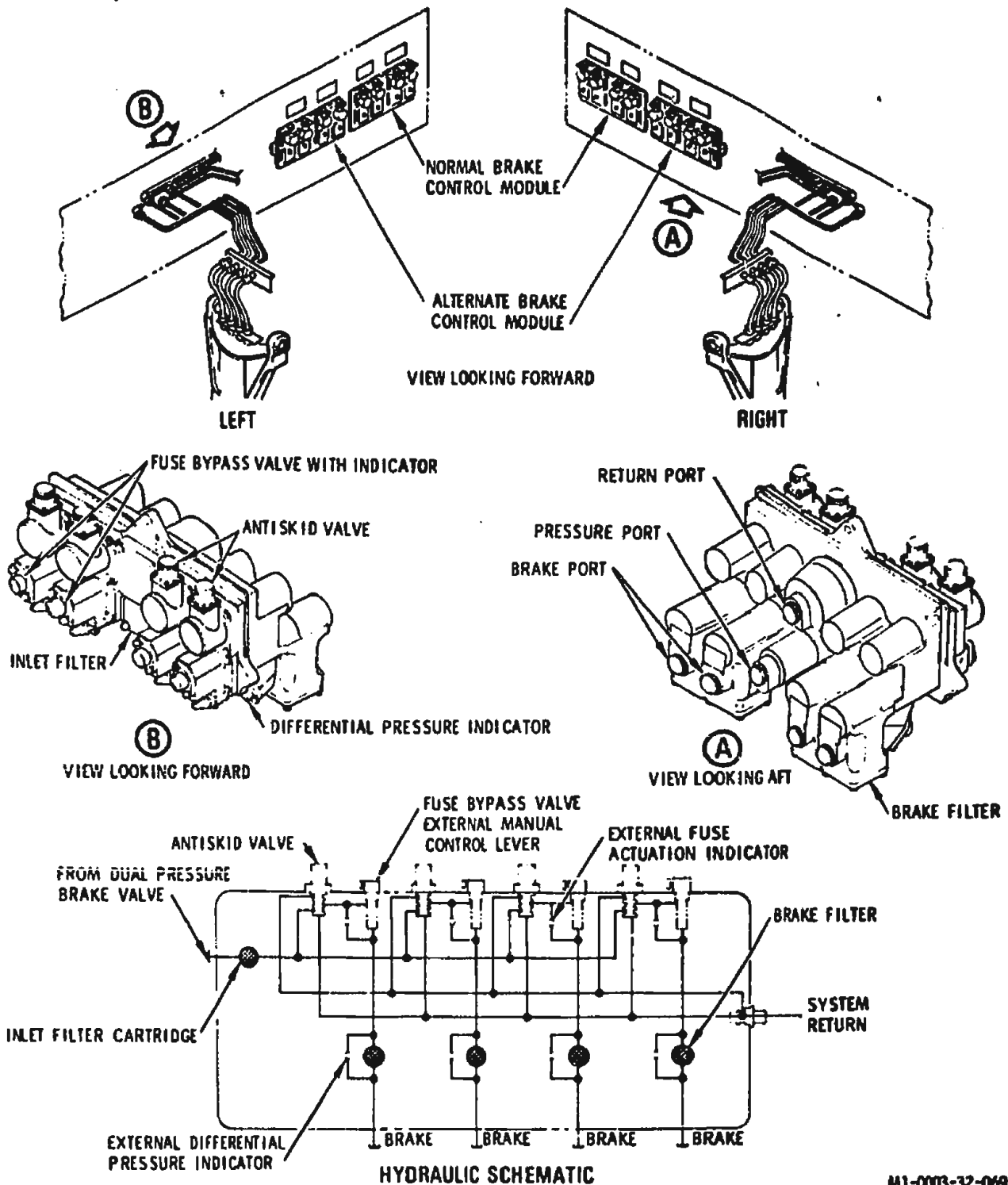
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Page 24
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL



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**Hydraulic Brake Control Module
Figure 10**

EFFECTIVITY: ALL

32-44-00
Page 25
Nov 15/82

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system return. A stopped wheel condition causes a rapid buildup of pressure in chamber A which drives the spool downward far enough to align chamber D with the brake line. Brake pressure is vented to hydraulic system return.

The two paralleled solenoid shutoff valves, when electrically actuated (deenergized), close off the return line during parking or emergency braking to prevent depleting the pressurized fluid in the accumulator.

6. Flight Station Antiskid Control Monitor

A. Description and Operation

One control monitor is provided for the system (Ref. Fig. 12). The monitor is mounted above the windshield and to the right of the left control column. The monitor provides the pilot with a means for checking out the antiskid system prior to takeoff or landing provided the normal brake system has been selected. The monitor also warns of various faults in the system by causing the indicator lights to come on.

The control monitor front panel contains eight brake release indicator lights (one for each wheel), one alternate action illuminated pushbutton power switch, and two standard pushbutton test switches (TEST NORM ALT). The pushbutton power switch incorporates a split screen lens with the words ON in the upper half (green) and OFF in the lower half (amber). The ON section comes on when power is applied to the system, indicating that the system is operational. The OFF section comes on when the system is not operational due to a loss of system power, or a loss of power to the shutoff valve which may be due to a failure, or the parking brakes may be in the set condition. The switch has a mechanical hold down feature when in the ON position, thereby providing a physical indication of switch condition when aircraft power is off.

Two separate pushbutton switches (TEST NORM ALT) are provided for testing the normal and alternate antiskid control valve circuits. Depressing either switch injects a simulated skid signal into each wheel control circuit resulting in a momentary release signal to the control valves. Satisfactory operation is indicated when the control monitor brake release indicator lights come on. These lights go off when the TEST switch is released. The shutoff valves are automatically deenergized during the test period to prevent a release of any applied brake pressure.

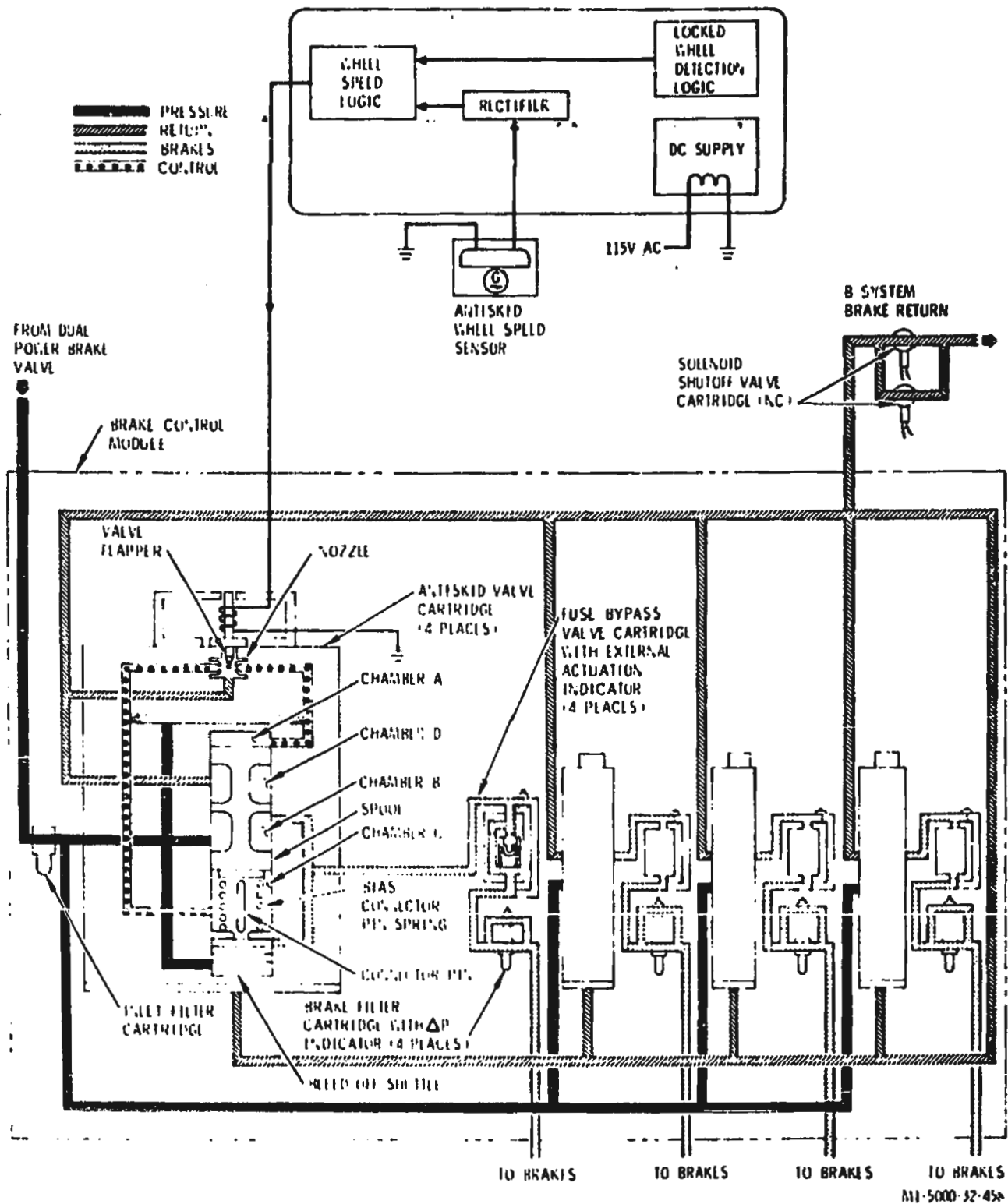
The brake release indicator lights continuously monitor antiskid control valve signals and warn the pilot of faulty

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Page 26
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL



Hydraulic Brake Control Module Schematic Diagram
Figure 11

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32-44-00
Page 27
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL

system operation. A full pressure release signal due to antiskid control action or failures in the system cause all these lights to come on. Occasional flashes of the lights during antiskid control action is normal; however, continuous flashing or continuous illumination indicates a faulty control circuit.

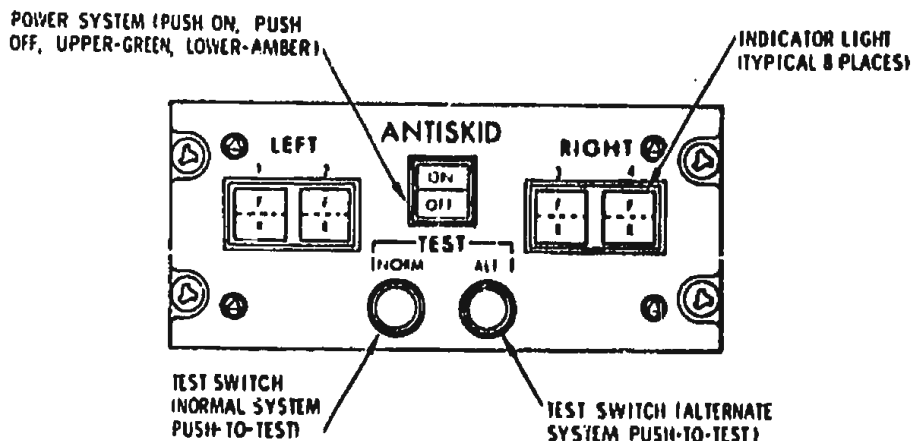
7. System Test and Monitor Circuits

A. General

In the following system test and monitor functional descriptions, the antiskid control test inputs and outputs for only one wheel are shown. The same inputs and outputs are applied simultaneously to the other wheels when the NORM or ALT test switch on the flight station control monitor is depressed.

B. System Test

The system test (Ref. Fig. 13) is a pilot-conducted confidence test of the antiskid electronic circuitry that can be performed prior to touchdown or prior to takeoff. The test can be conducted only when the normal brake system has been selected. The test is a dynamic response test that



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Flight Station Antiskid Control Monitor
Figure 12

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EFFECTIVITY: ALL

32-44-00
Page 28
Nov 15/82

LOCKHEED



MAINTENANCE MANUAL

assures proper operation of the antiskid control system. Proper operation of the antiskid control system is indicated by all eight brake release indicator lights on the flight station control monitor coming on. The response to the test is the same in flight as during preflight testing.

To initiate the test, the pilot verifies that the normal brake system has been selected and then depresses and holds either the TEST NORM or TEST ALT switch on the flight station control monitor. If the alternate brake system has been selected, the test circuit will not respond. Depressing the TEST switch activates a signal to test circuits in the Electronic Control Unit (ECU) and removes power from the Normal Relays No. 1 and No. 2. The signal to the shutoff valves No. 1 and No. 2 is decreased sufficiently to ensure brake pressure is not removed during testing of the antiskid control system while the aircraft is parked.

The test signal gate momentarily applies, then removes, a 200-Hz signal to the wheel speed sensor coil. The 200-Hz frequency is equivalent to a wheel speed signal generated at approximately 37 mph. The deep skid detector recognizes removal of the 200-Hz signal as an impending skid and momentarily applies a full brake pressure release signal through the voltage amplifier and valve current driver to the antiskid control valves.

The light logic circuit monitors the voltage and current of the valve circuits of the selected normal or alternate brake system. When the voltage is within 5 to 20 volts and the current is not less than 7 milliamperes, the brake release light on the flight station control monitor will come on, indicating a good system. The light will remain on as long as the flight station control monitor TEST switch is depressed. The brake release light will go off when the TEST switch is released.

The disable circuit sends a signal to the modulator and locked wheel arming circuits to disable them during the test and for 0.1 second after the TEST switch is released, completing the test. Disabling the circuits is necessary to prevent their memory circuits from giving a false pressure release signal after the test is completed.

The window generator sends a pulse signal of 0.1-second duration to the light logic circuits. During the 0.1-second period, the light logic circuits monitor the antiskid control valve circuit while the 200-Hz signal is on the wheel speed sensor coil. During this period no antiskid control valve signal shall be present. The presence of a control valve signal during this period is detected as an amplifier failure, and the light logic prevents the brake

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Page 29
Nov 15/82



release indicator light from coming on at the end of the 200-Hz test signal period. This test procedure is incorporated into the system in order to detect failure in the control circuitry that does not produce a valve control signal of at least 15 volts, which is required to operate the light logic. The light logic circuits continuously monitor the valve circuits during antiskid control, and therefore, a weak valve signal fails to cause the brake release indicator light to come on for that antiskid control valve.

The reset circuit sends a signal pulse of 0.1-second duration to the deep skid detector when the TEST switch is released. This signal pulse resets the memory circuits to the initial condition to prevent any brake release signal that might occur as a result of any residual speed still remaining in the circuit.

The antiskid control circuits and light logic circuits are located on the eight ECU wheel control boards. The test signal gate, reset and disable, window generator, and shutoff valve (parking brake) test and monitor circuits are located on the inboard and outboard system test and monitor boards. This arrangement provides separate test circuits for the inboard and outboard wheels for failure isolation.

The following antiskid system failures prevent the brake release lights from coming on:

- Short or open in the wheel speed sensor coil or wiring

- Short or open in the antiskid control valve coil or wiring

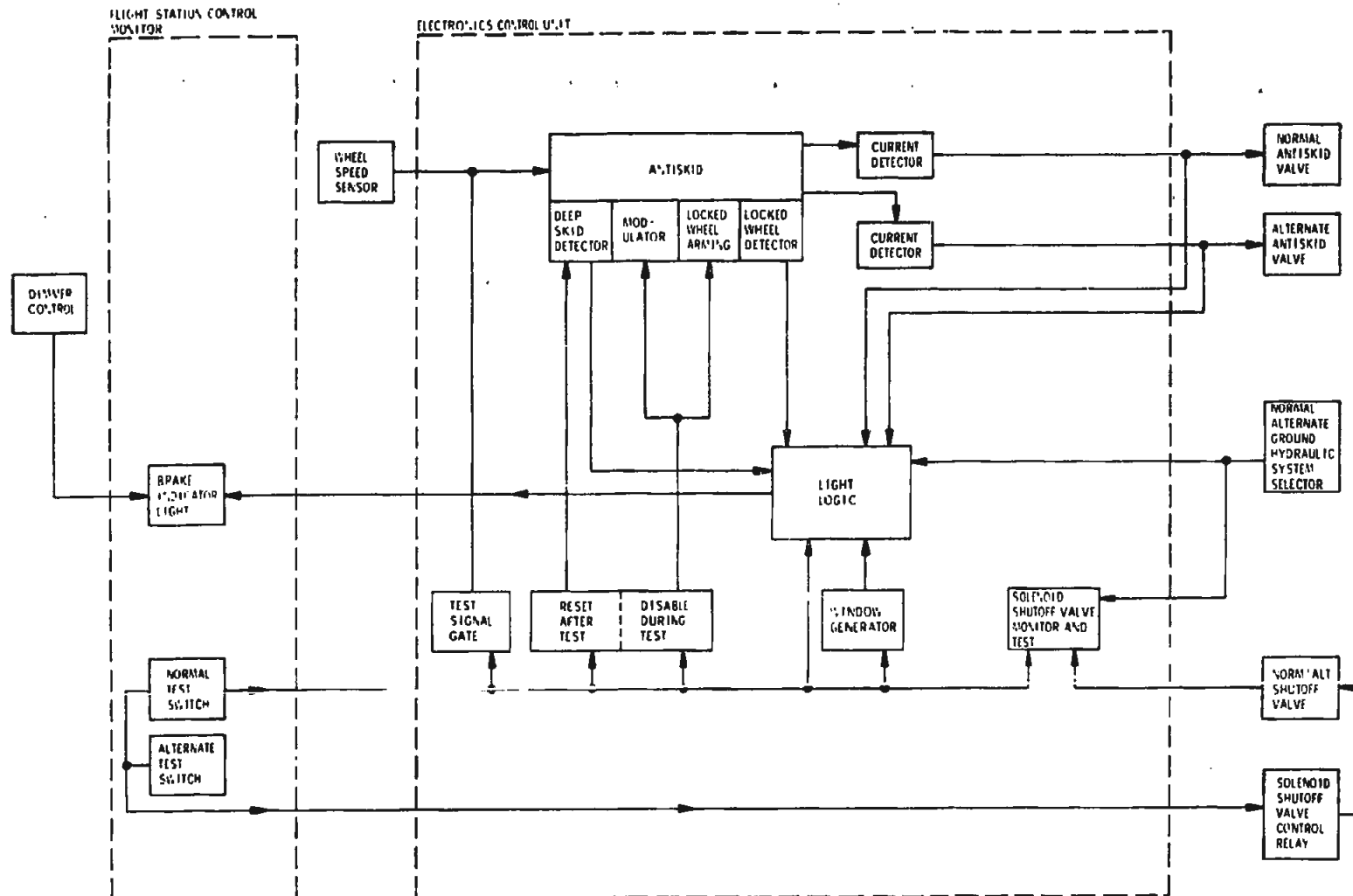
- Failure in ECU control circuitry

- Four inboard lights not coming on is due to a failure in inboard system test

- Four outboard lights not coming on is due to a failure in outboard system test

C. System Monitoring

Monitor circuits built into the antiskid control circuits continuously monitor the system operation and give visual indication by causing the brake release lights on the Flight station control monitor to come on or go off when the monitored circuits fail. These circuits make it possible for the pilots to know continuously that the antiskid system is functioning. In the event of a system failure, the



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Antiskid Control System Test Block Diagram
Figure 13

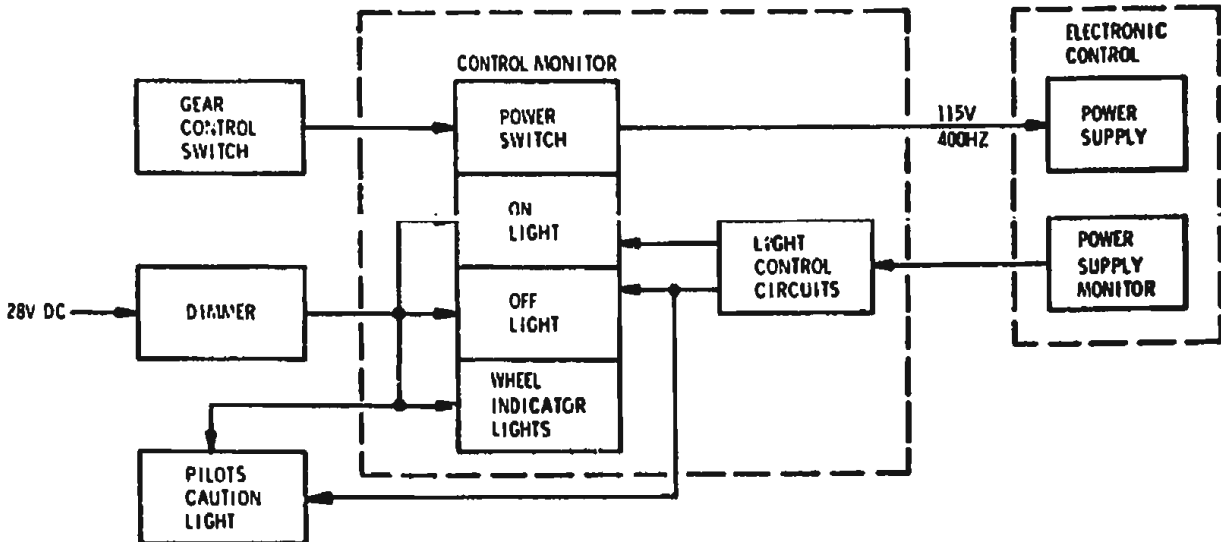
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The power supply monitor (Ref. Fig. 14) circuits are part of the ECU power supply. Monitoring is continuous during antiskid control and indication of failure in the monitored circuits is automatic.

The +10 vdc and -10 vdc output of the power supply is monitored by the monitor circuits. When the +10 vdc or -10 vdc power supply fails, the monitor circuit sends a signal to the flight station control monitor that causes the ON indicator light to go off and causes the OFF indicator light to come on. In addition, the pilots annunciator panel ANTISKID caution light comes on.

A fault in the +16 vdc output of the power supply is identified by the monitor circuits and causes the ON indicator light to go off, and causes the OFF and ANTISKID caution lights to come on.



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Power Supply Monitoring Figure 14

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32-44-00

Page 33
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL

The +40 vdc power source for the valve current drivers is monitored and causes the OFF and ANTISKID caution lights to come on and causes the ON light to go off.

Failure in the 115-volt, 400 Hz operating power to the antiskid system is detected by the monitor circuits and causes the ON light to go off, and causes the OFF and ANTISKID caution lights to come on.

(2) Shutoff Valve Monitor

The shutoff valve monitor (Ref. Fig. 15) samples the center-tap voltage of the shutoff valve (parking brake) coils. With the parking brake off, the shutoff valve coils are energized with 28-vdc aircraft power. The voltage at the center-tap of a coil should be between 5 and 18 volts dc. When the center-tap voltage is out of this range, the monitor circuit sends a signal to the flight station control monitor to cause the ON light to go off and cause the OFF light to come on. The pilots annunciator panel ANTISKID caution light also comes on. These lights (OFF and ANTISKID) come on as a normal function when the parking brake control is in the SET position, because the power is then removed from the shutoff valve coil. If the OFF and ANTISKID lights come on when the parking brake control is not on, it is an indication of a failure in the shutoff valves or a system power failure. The pilots may then select the alternate brake system. If the shutoff valves are at fault, the OFF and ANTISKID caution lights go off and the ON light comes on. If the system power is at fault, the OFF and ANTISKID caution lights will remain on.

During the system test, the shutoff valves are deenergized to prevent release of brake pressure when the airplane is parked. The OFF and ANTISKID caution lights are prevented from coming on during the system test by a signal from the TEST switch that disables the monitor circuit.

(3) Antiskid Control Valve Monitor

the light logic circuit continuously monitors the current and voltage to each antiskid control valve (Ref. Fig. 16). This circuitry detects full release signals and causes the associated flight station control monitor brake release lights to come on.

When under the following conditions the brake release indicator lights come on, the condition is normal and a failure has not occurred:

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EFFECTIVITY: ALL

32-44-00
Page 34
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL

During system test while the TEST NORM or TEST ALT switch is depressed

During deep skid detector operation during a brake stop

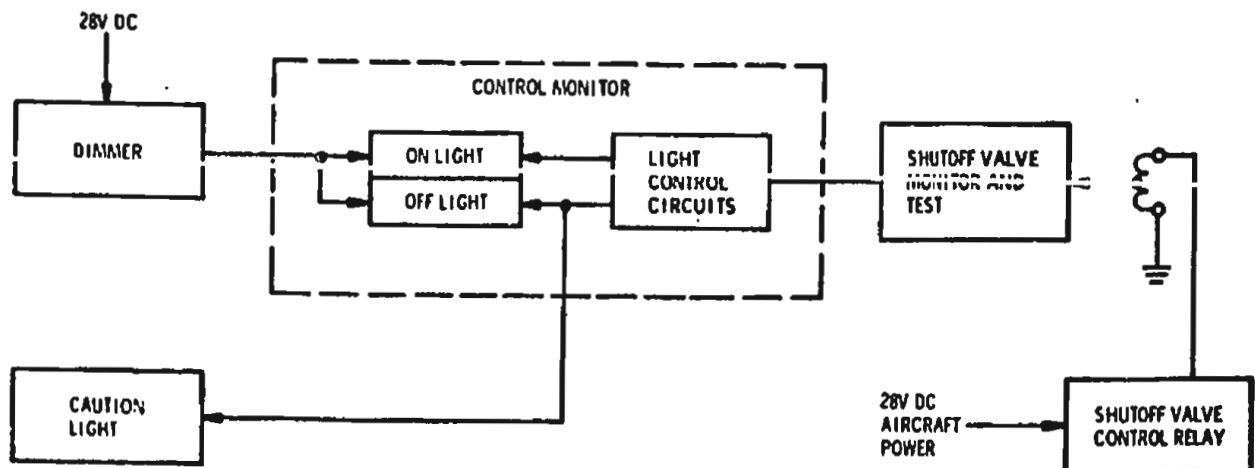
During locked wheel detector operation during a brake stop

A flight station control monitor brake release indicator light coming on under any other conditions indicates a failure in the antiskid control system.

8. Component Test Circuits

A. General

The component test circuits built into the antiskid system make it possible for line maintenance personnel to perform on-board system testing and fault isolation under system operating conditions while the antiskid system is still interconnected on the aircraft. Built-in test circuits make it possible for line maintenance personnel to isolate malfunctions to a line replaceable unit (LRU). These LRUs are spared and can be replaced at their location with



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Shutoff Valve Monitoring
Figure 15

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EFFECTIVITY: ALL

32-44-00
Page 35
Nov 15/82

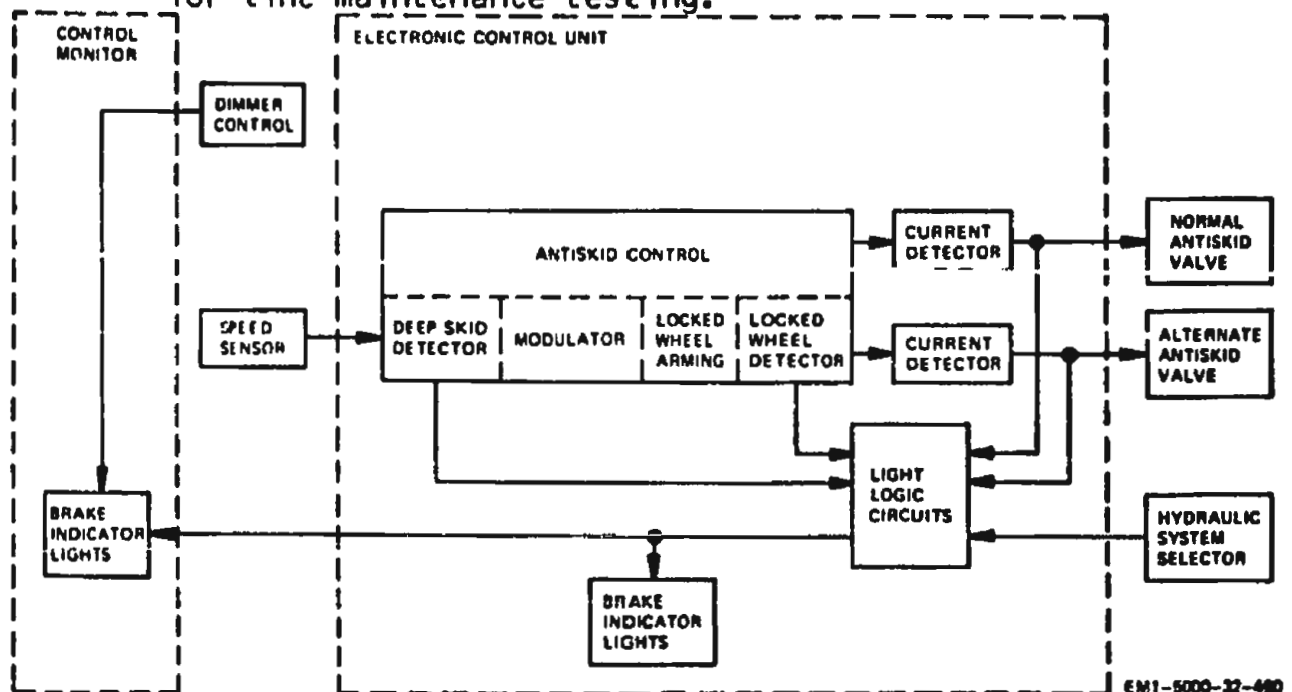
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MAINTENANCE MANUAL

minimum effort when the malfunctioning unit has been identified. The LRUs that can be isolated by the built in test circuits are:

- Wheel speed sensor
- Antiskid control valve
- Shutoff valve (parking brake)
- Flight station control monitor
- Electronic control unit (ECU)
- Antiskid control board
- Monitor and system test board
- Component test board

B. Built In Test Equipment (BITE)

Component testing is accomplished by built-in test equipment. The circuits are an integral part of the antiskid system. External test equipment is not required for line maintenance testing.



Antiskid Control Valve Monitoring
Figure 16



The test circuits used for BITE are the same circuits used in the pilots system tests. However, the circuits are energized for testing through the ECU selector switch and TEST switch instead of the flight station control monitor switches. The normal brake system must have been selected when performing a BITE test.

(1) Electronic Control Unit (ECU) Front Panel

The control and malfunction indication of the BITE is on the ECU front panel (Ref. Fig. 17). Controls and indicators are as follows:

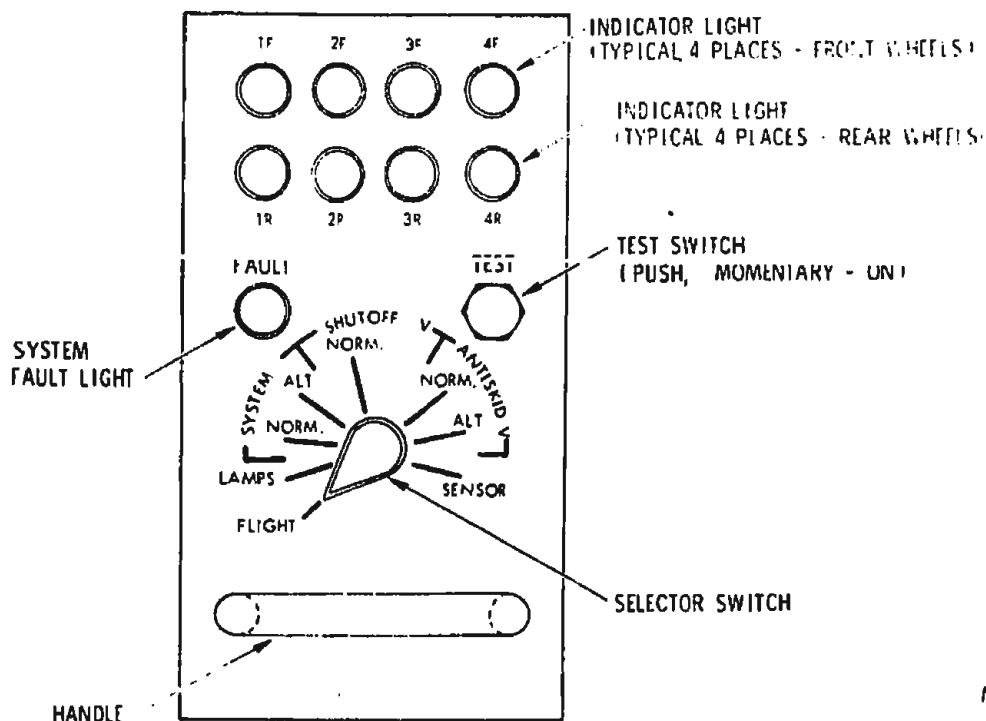
Eight wheel indicator lights (amber)

A system FAULT light (amber)

A nine position selector switch (one position not used)

A momentary on TEST switch

The eight wheel indicator lights (1F, 2F, 3F, 4F, 1R, 2R, 3R, 4R) indicate malfunctions in the individual wheel circuits. The display of malfunctions is the same as the brake release



ECU Front Panel
Figure 17

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AM-0101-32-075

R EFFECTIVITY: ALL

001B

32-44-00
Page 37
Nov 15/82



MAINTENANCE MANUAL

indicator lights on the flight station control monitor, because the circuits are the same for both.

The FAULT indicator light operates from the same control circuit as the flight station control monitor OFF light and the pilots annunciator panel ANTISKID light. The FAULT light indication of malfunctions is the same as the OFF and ANTISKID lights, except that the FAULT light will not come on when 115-volt, 400-Hz power is not available to the antiskid system.

The TEST switch is a spring loaded switch (momentary on) which is actuated (depressed) and held in order to initiate a test for each of the selector switch test positions. When the TEST switch is released, the test circuits are disconnected and the antiskid system circuits are restored.

(2) Selector Switch Test Positions

The selector switch has seven positions for test selection and one position, labeled FLIGHT, which disconnects the BITE test circuits from the antiskid system. The switch should be returned to this position when testing is completed.

(a) LAMPS Position

When the test selector switch is in the LAMPS position and the TEST switch is depressed, each indicator light circuit is completed through a diode to ground (Ref. Fig. 18). The circuits to the eight indicator lights on the flight station control monitor are also completed. All eight ECU indicator lights and the FAULT light, and the eight flight station control monitor indicator lights should come on during the test.

Operating power for the ECU indicator lights and the FAULT light is supplied by a transformer-rectifier unit in the ECU power supply. Input to the transformer is 115 volts, 400 Hz, output is 40 volts peak rectified and unfiltered. The FAULT light is powered from the filtered section of the 40-volt transformer-rectifier unit. The resistor drops the voltage to the FAULT light to 23 vdc.

LOCKHEED
MAINTENANCE MANUAL

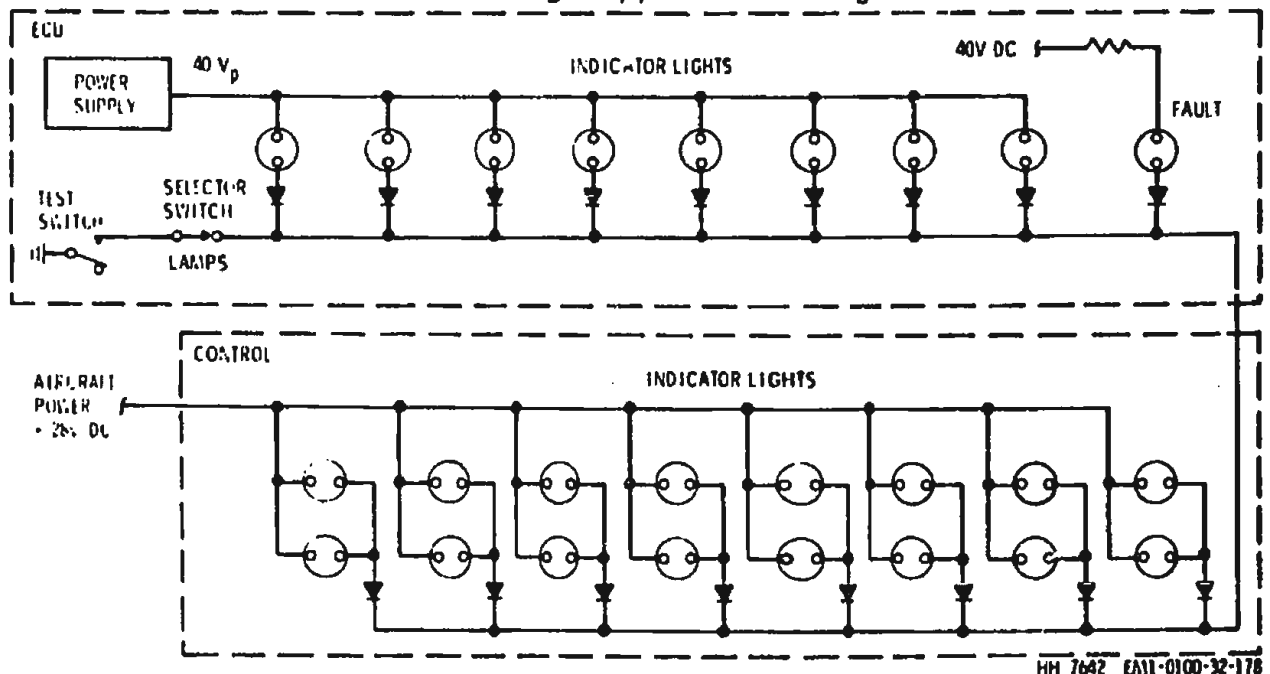
A diode in the test circuit for each light isolates the light test circuits from the wheel monitor circuit.

(b) SYSTEM Positions (NORM-ALT)

The tests performed and the indicator light response in the ECU positions (SYSTEM NORM and SYSTEM ALT) are identical to the flight station control monitor NORM and ALT system tests. Therefore, these positions of the selector switch provide a means of fault isolation to the flight station control monitor.

(c) SHUTOFF V Position (NORM)

The selector switch SHUTOFF V position (Ref. Fig. 19) is used for checking the shutoff valves (parking brake). The NORM position is used. The two shutoff valves are tested simultaneously when the TEST switch is depressed. However, light indications show when one or both valves are defective, only the test portion of the shutoff valve monitor and test circuitry is energized during a test. The test circuitry is energized by a dc voltage applied through the TEST and selector



**BITE Lamp Test
Figure 18**

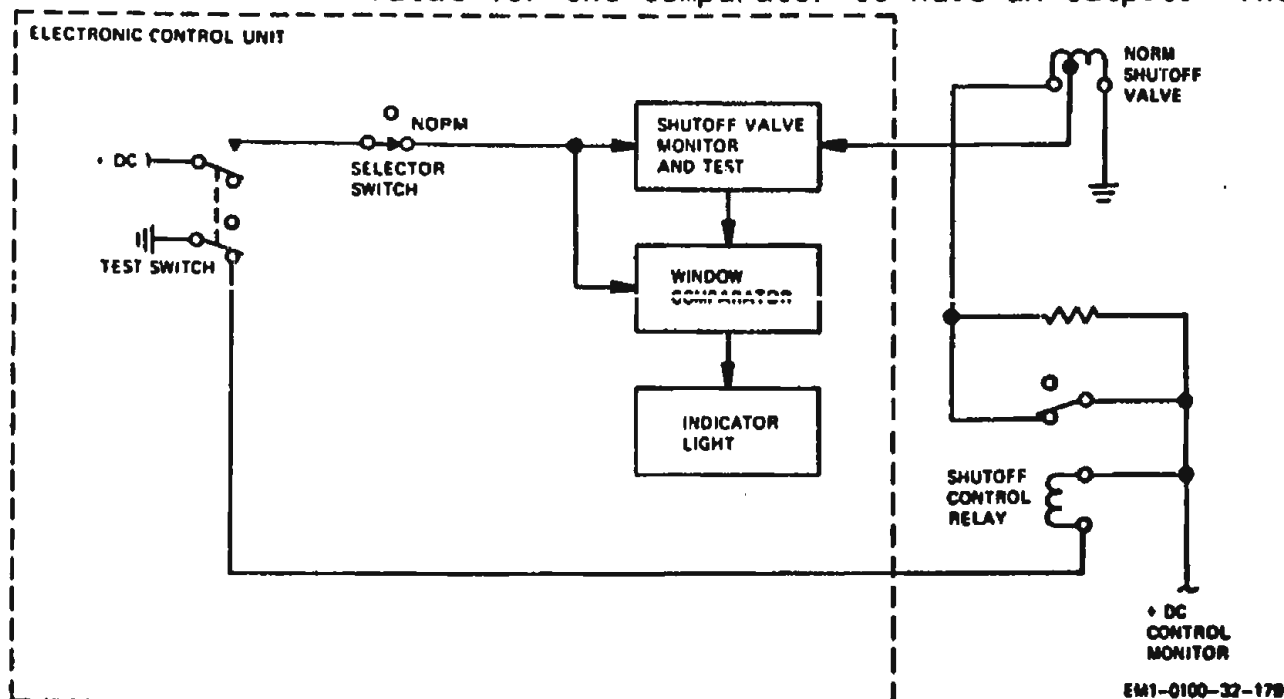


MAINTENANCE MANUAL

switches. This arrangement prevents any failure in the test circuits from interfering with antiskid operation. When the TEST switch is depressed, the shutoff valve control relay is deenergized, removing all power to the shutoff valve except a small trickle current through the resistor. This trickle current generates a potential of 0.5 volt to 1.8 volts at the center tap, which is monitored by the window comparator in the monitor and test circuit.

(d) ANTISKID V Positions (NORM-ALT)

In these positions, the continuity of antiskid control valve coils is tested in both the normal and alternate brake systems (Ref. Fig. 20). Circuitry for this test consists of a multiplexer and window comparator, which operate the indicator light. The multiplexer is an electronic switch which produces an output when operating power is applied from the TEST switch and the input from either R2 or R3 is present. The window comparator compares the input from the multiplexer with reference voltage. The input to the window comparator must be within a minimum and a maximum value for the comparator to have an output. The



SHUTOFF V Position
Figure 19

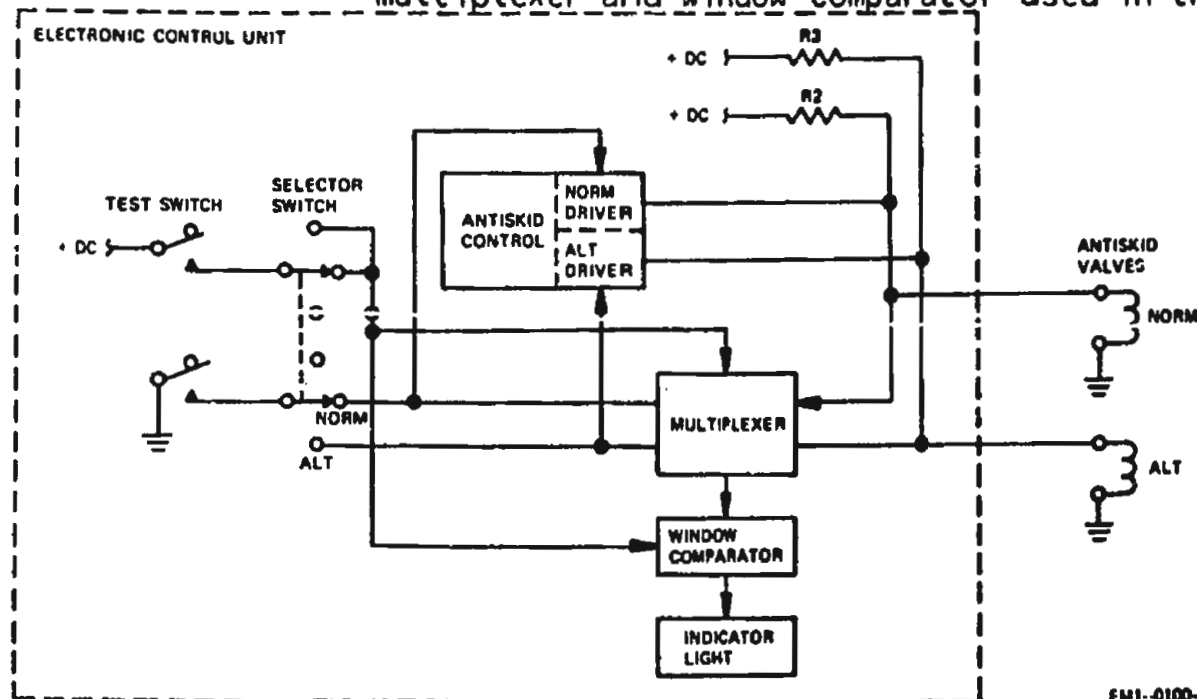


power to test antiskid control valves is applied by the TEST switch through the selector switch.

A trickle current is applied to each antiskid control valve through resistors R2 and R3, which develops a potential of 0.5 volt to 1.8 volts across the coils. This potential is switched by the multiplexer to the window comparator, which compares it with the reference voltage. If the voltage across the coil is in the correct range, the indicator light will come on. The valve current driver circuits are disabled during the test by grounding their inputs through the selector switch and TEST switch. This is necessary because any output from the drivers during the test appears as a faulty coil. The test voltages must be of the correct magnitude for the comparator to cause the indicator light to come on.

(e) SENSOR Position.

In this position, the continuity of the wheel speed sensor coils is tested (Ref. Fig. 21). The circuitry for this test consists of the multiplexer and window comparator used in the



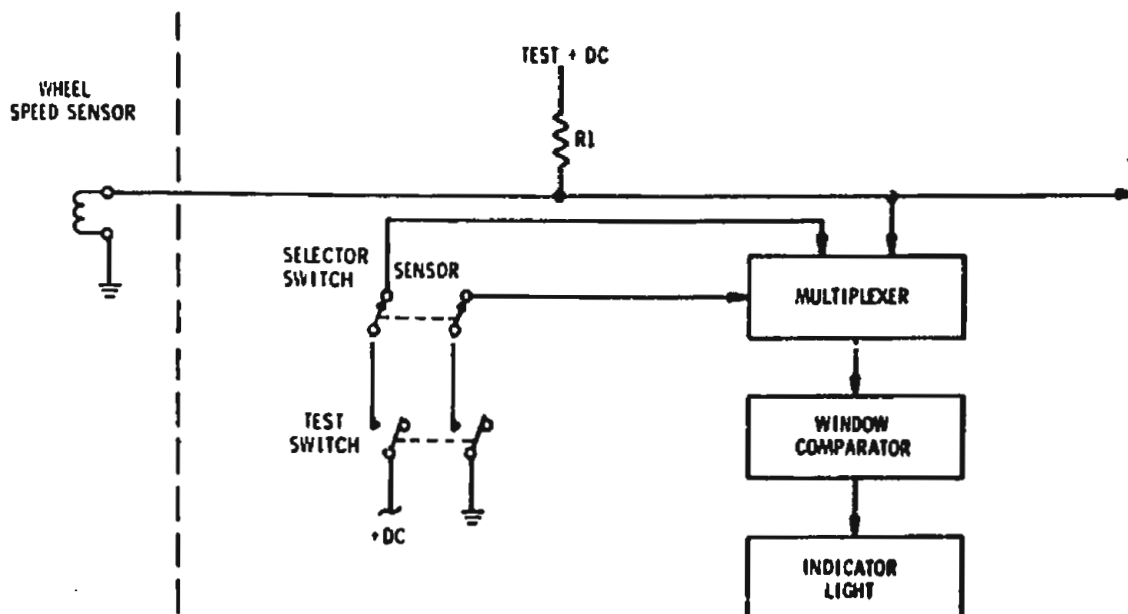
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ANTISKID V Positions
Figure 20

LOCKHEED
MAINTENANCE MANUAL

antiskid control valve coil test. A trickle current is applied through R1 to the wheel speed sensor coil. This trickle current develops a small potential across the wheel speed sensor coil, which is monitored by the window comparator. If the potential across the coil is of the correct magnitude, the associated indicator light comes on.

The trickle current is applied through the selector and TEST switches during test and is removed when the TEST switch is released. Any test power applied during normal antiskid operation may cause an abnormal signal to be transmitted to the antiskid control system.



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SENSOR Position
Figure 21

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EFFECTIVITY: ALL

32-44-00
Page 42
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL

R ANTISKID CONTROL SYSTEM -- FAULT ISOLATION

R 1. General

R Reference data and fault isolation procedures for
R troubleshooting landing gear system faults are included in this
R section of the manual. A landing gear system malfunction
R detected by the flight crew is normally entered in the aircraft
R flight log book and reported to maintenance personnel by a FIRM
R fault code number. This number and the flight log book write-up
R can be found in the Chapter 32 Fault Code Index. The index
R specifies the maintenance manual section, fault isolation
R diagram figure number and, where appropriate, a block number
R indicating the diagram entry point containing the fault
R isolation procedure. When no block number is specified, the
R diagram entry point is block 1.

R Prerequisites listed at the top of each diagram identify
R mandatory preliminary steps and circuit breakers that must be
R closed before initiating any fault isolation step.

R Schematic diagrams, identified by a SCHEM number, supplement
R fault isolation procedures as maintenance aids. The schematics
R show the basic system circuitry necessary for troubleshooting
R and include cross-reference indexes to the wiring diagram manual
R pages required for checking component interconnect wiring.

R 2. Fault Isolation

R Table 101 is a list of fault isolation data in this section of
R the manual.

Antiskid Control System - Fault Isolation
Table 101

FIGURE	TITLE
101	Component Location Index
102	Component Locator Diagram
103	All or Group of Four Wheel Lights Out During Test
104	One Wheel Light Out During Test
105	Wheel Lights On, No Test in Progress
106	ON Light Out, OFF Light On, NORM SYS B Selected

EFFECTIVITY: ALL

32-44-00
Page 101
Mar 15/81

LOCKHEED



MAINTENANCE MANUAL

Antiskid Control System - Fault Isolation (Cont)
Table 101

R
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FIGURE

TITLE

- | | |
|---------|---|
| 107 | ON Light Out, OFF Light On, ALT SYS C Selected. |
| 108 | System Will Test With ALT SYS C Selected. |
| SCHEM 1 | Antiskid Control Power Electrical Schematic |

EFFECTIVITY: ALL

0018

LOCKHEED
MAINTENANCE MANUAL

COMPONENT	QTY	AREA/ACCESS	REFERENCE
BOARD, MONITOR AND SYSTEM TEST	2	MESC, IN ECU; 192K/192EA	32-44-07
BOARD, WHEEL CONTROL	8	MESC, IN ECU; 192K/192EA	32-44-08
CONTROL LEVER, LANDING GEAR	1	FLIGHT STATION; P2	32-31-14
ELECTRONIC CONTROL UNIT	1	MESC; 192K/192EA	32-44-06
MONITOR, ANTISKID CONTROL	1	FLT STN OVHD PNL; P5	32-44-05
SENSOR, WHEEL SPEED	8	MLG AXLE UNDER HUBCAP	32-44-04
SWITCH, BRAKE SYSTEM SELECT	1	FLIGHT STATION; P2	32-44-17
VALVE, ANTISKID CONTROL	16	MLG STRUT WELL	32-44-02
VALVE, PARKING BRAKE SHUTOFF	2	HSC CEILING; 147AB	32-44-03

M1-0000 32-049

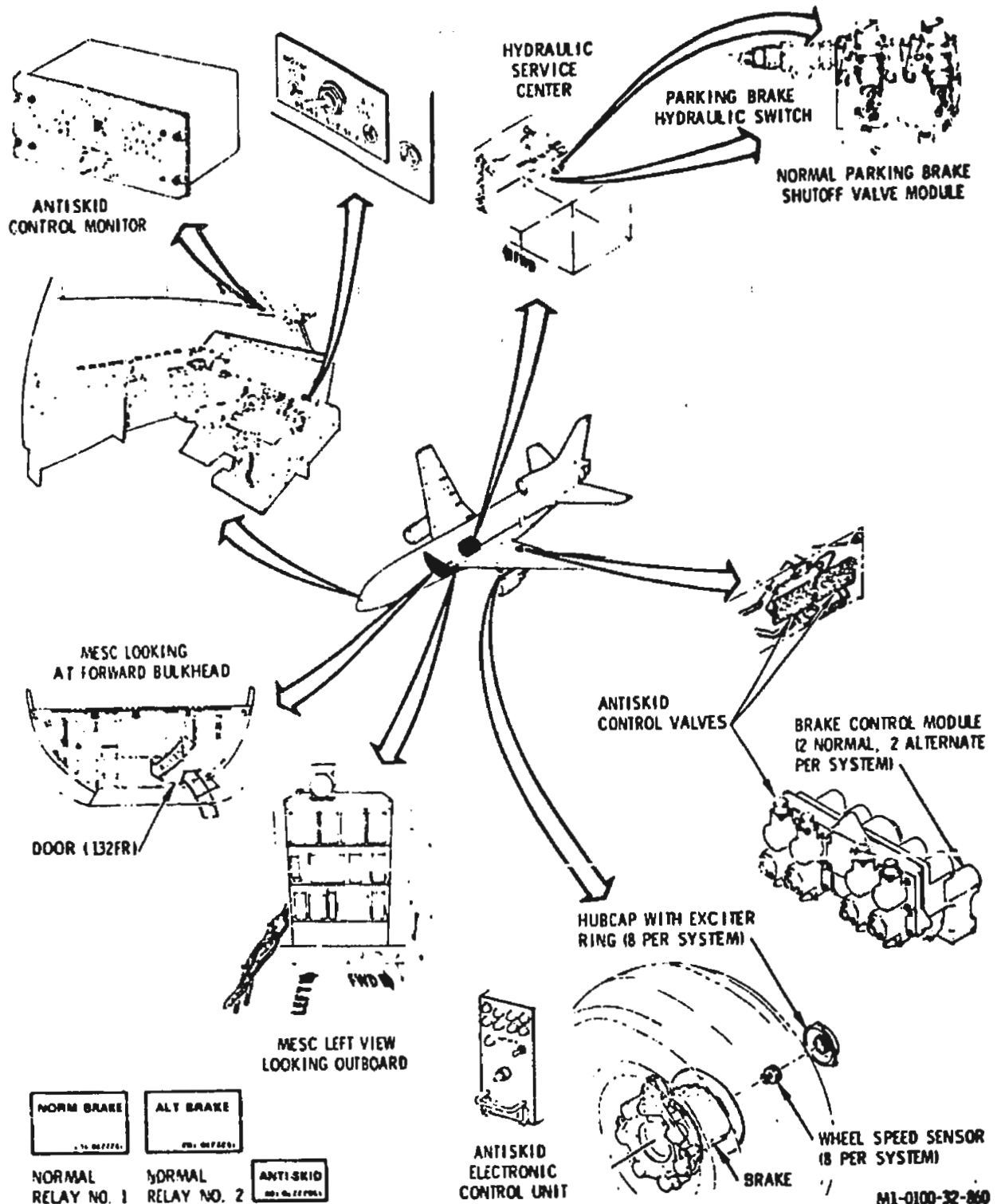
Component Location Index
Figure 101

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EFFECTIVITY: ALL

32-44-00
Page 103
Mar 15/81

LOCKHEED
MAINTENANCE MANUAL



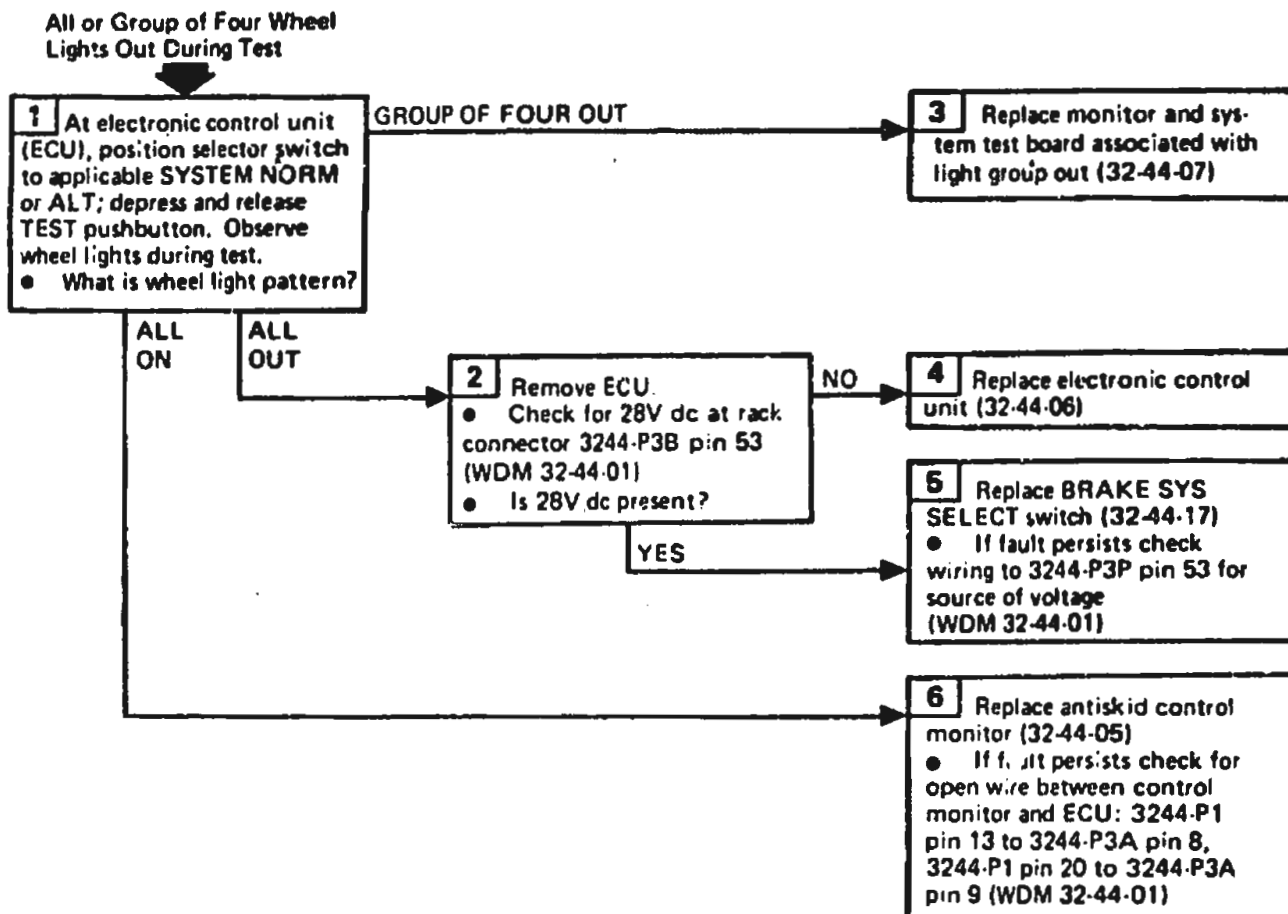
Antiskid Control System Component Location
Figure 102

EFFECTIVITY: ALL

32-44-00
Page 104
Mar 15/81

R
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001B

LOCKHEED
MAINTENANCE MANUAL



PREREQUISITES

Electrical Power on (24-00-00)
LANDING GEAR control lever DOWN
ANTISKID Monitor ON/OFF switchlight latched in
BRAKE SYS SELECT switch to NORM SYS B
Parking Brakes off
ECU LAMPS test performed OK
Pilots panel LAMPS test performed OK

M1-0101-32-635

All or Group of Four Wheel Lights Out During Test
Figure 103

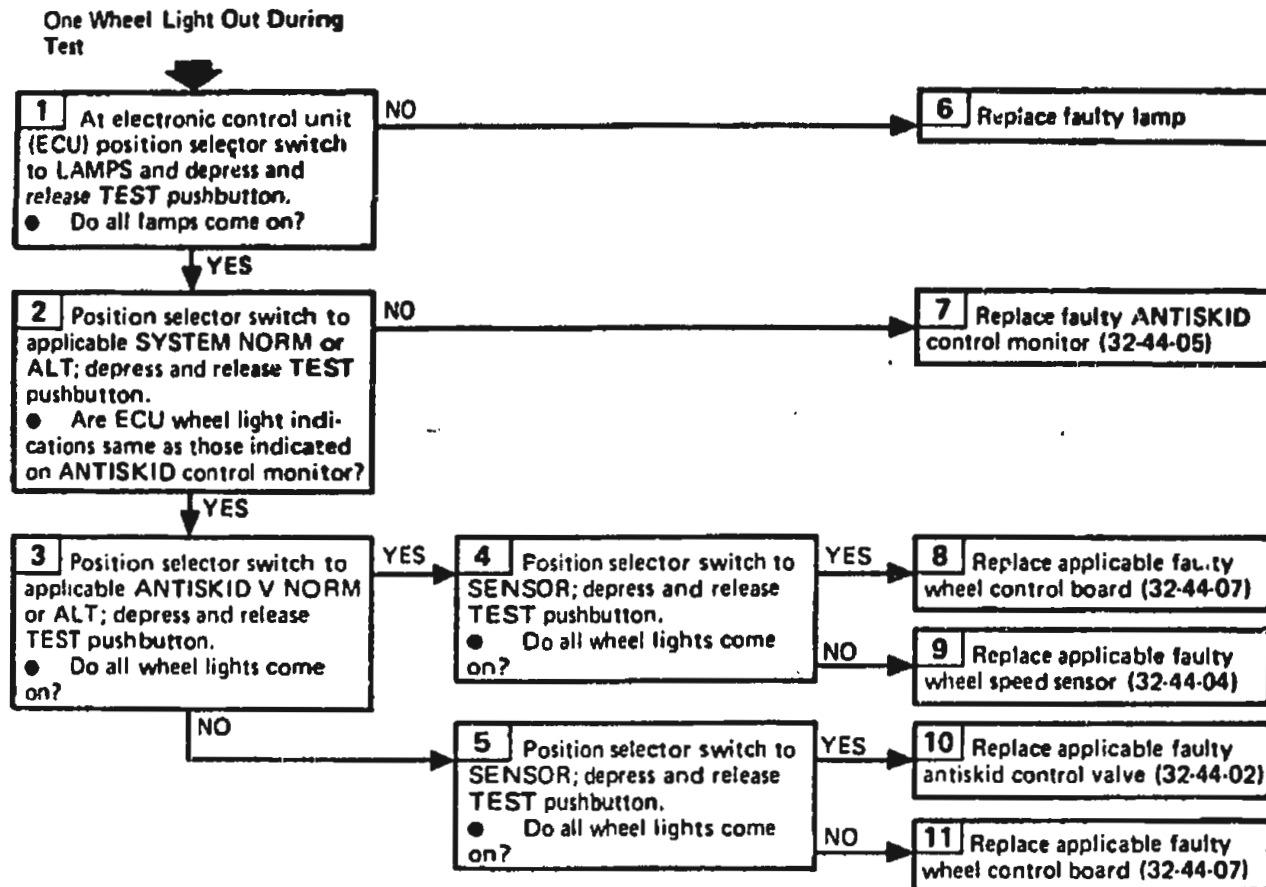
EFFECTIVITY: ALL

32-44-00

Page 105
Mar 15/81

R
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001B

LOCKHEED
MAINTENANCE MANUAL



PREREQUISITES

Electrical Power on (24-00-00)
LANDING GEAR control lever down
ANTISKID Monitor ON/OFF switchlight latched in
BRAKE SYS SELECT switch to NORM SYS B
Parking Brakes off
CB's: CB2-F22, G18, G22

M1-0100-37-43

One Wheel Light Out During Test
Figure 104

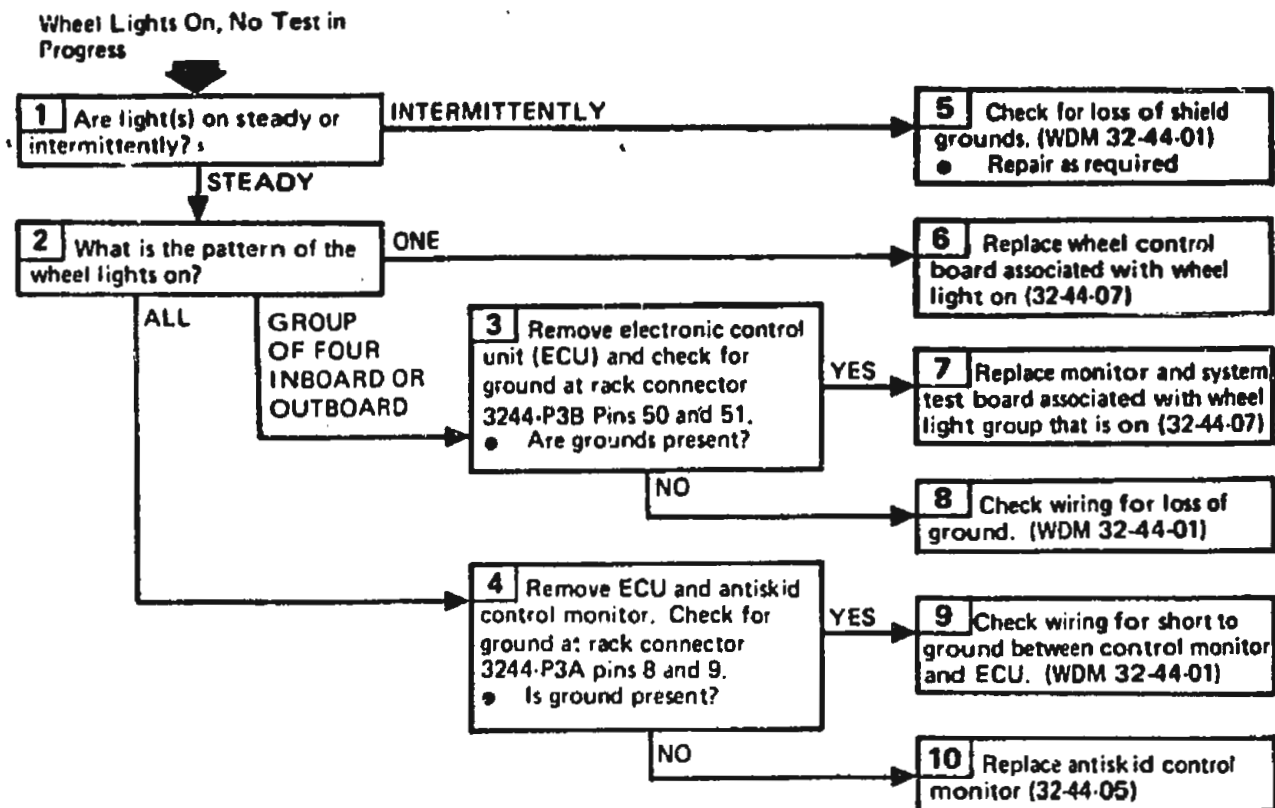
EFFECTIVITY: ALL

32-44-00
Page 106
Mar 15/81

R
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001B

LOCKHEED

MAINTENANCE MANUAL



PREREQUISITES

Electrical Power on (24-00-00)
 LANDING GEAR control level DOWN
 ANTISKID Monitor ON/OFF switch latched in
 Parking Brakes off
 ECU LAMPS test OK
 CB's in: CB2-F22, G18, G22

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R
R

Wheel Lights On, No Test in Progress
Figure 105

EFFECTIVITY: ALL

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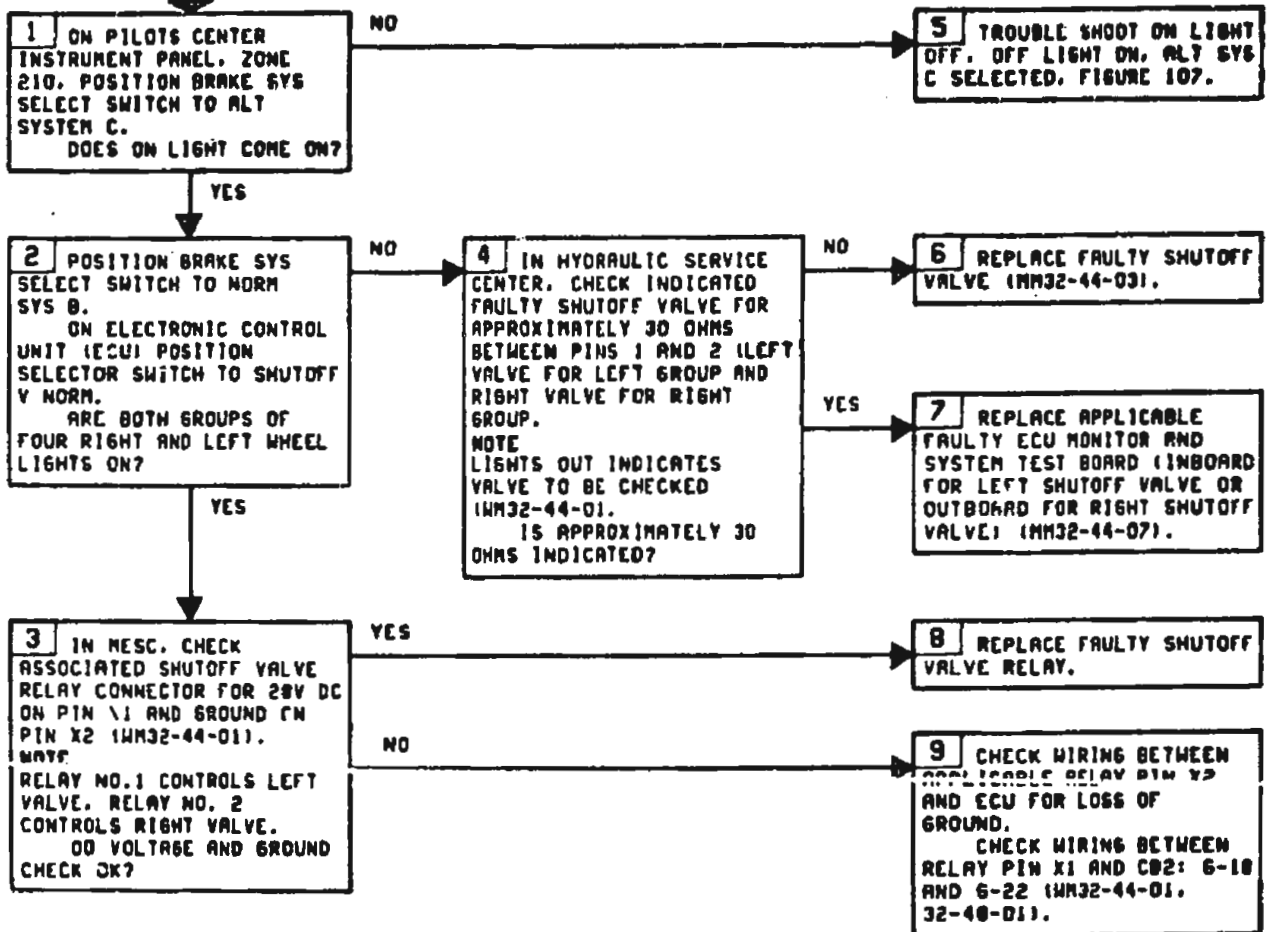
32-44-00

Page 107
Mar 15/81

LOCKHEED
MAINTENANCE MANUAL

PREREQUISITES
ELECTRICAL POWER ON (MM24-00-00)
LANDING GEAR CONTROL LEVER DOWN
ANTI-SKID MONITOR ON/OFF SWITCH LATCHED IN
PARKING BRAKES OFF
ECU LAMPS TEST OK
CB'S IN: CB2-F22, 518, 622

ON LIGHT OUT,
OFF LIGHT ON,
NORM SYSTEM
B SELECTED



NI-0002-32-539

R
R

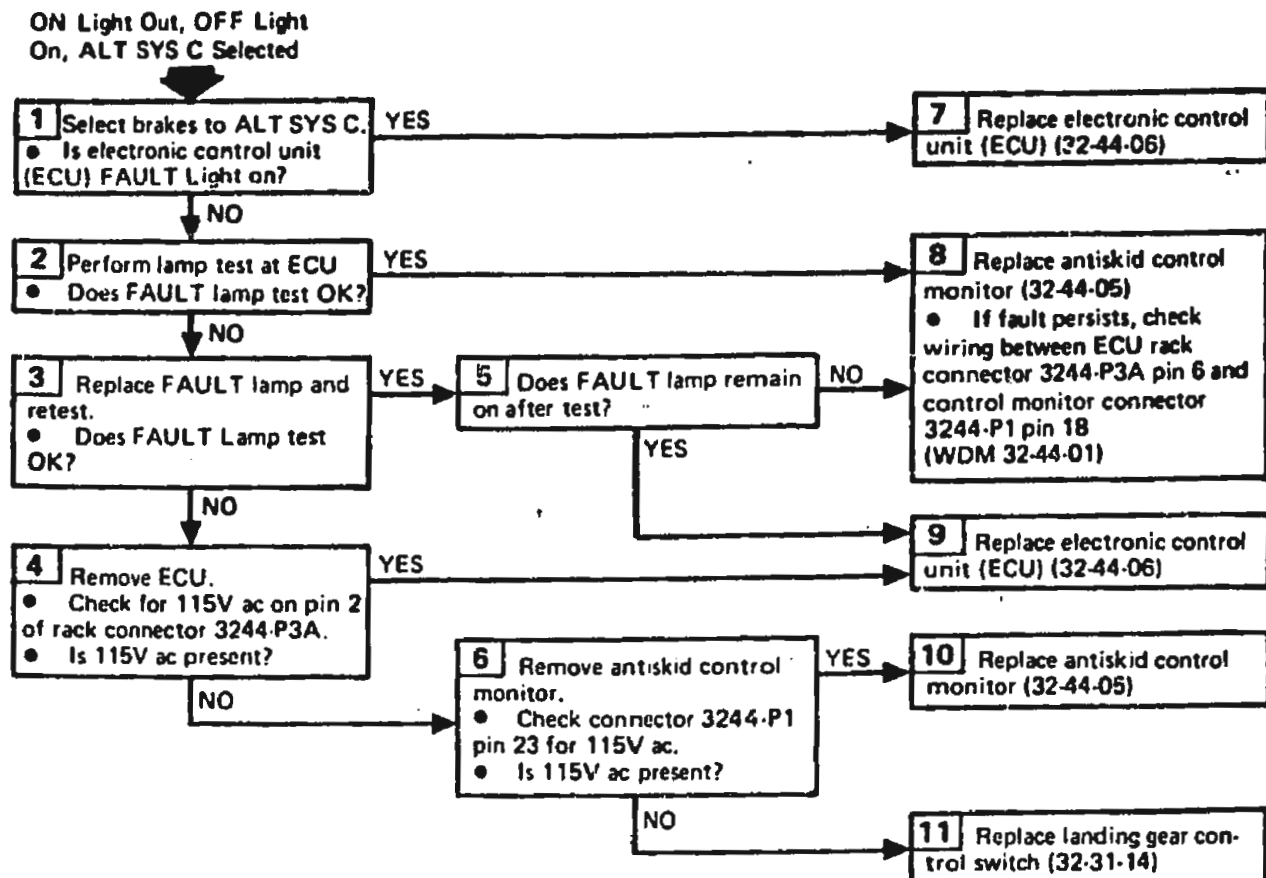
ON Light Out, OFF Light On, NORM SYS B Selected
Figure 106

EFFECTIVITY: ALL

0018

32-44-00
Page 108
May 15/82

LOCKHEED
MAINTENANCE MANUAL



PREREQUISITES

Electrical Power on (24-00-00)
LANDING GEAR control lever DOWN
ANTISKID Monitor ON/OFF switch latched in
Parking Brakes off
ECU LAMPS test OK
CB's in: CB2-F22, G18, G22

M1-0100-32-663

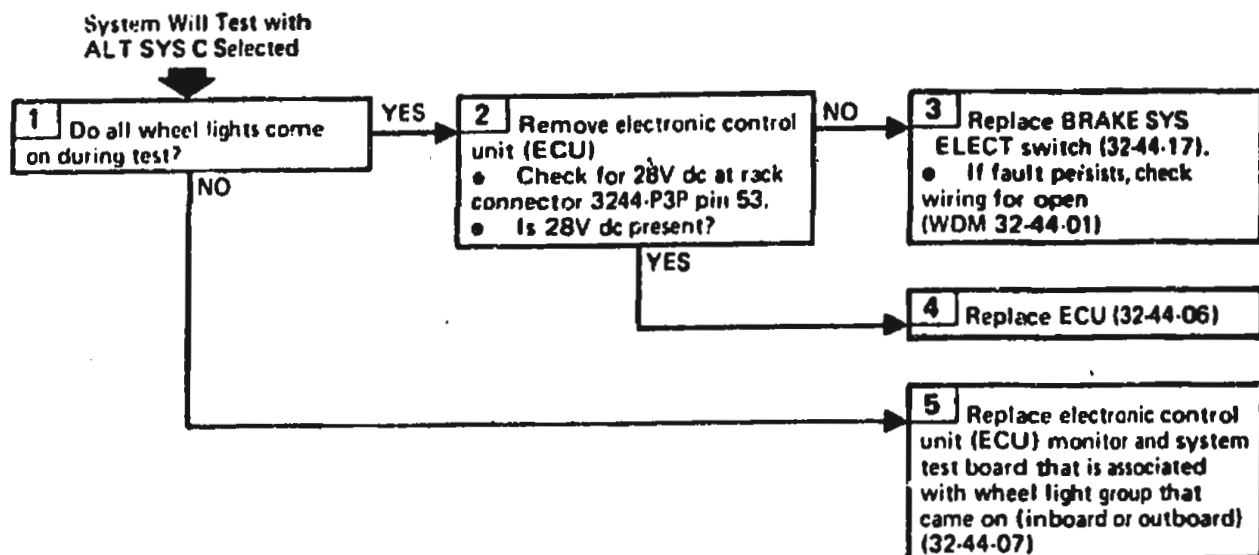
ON Light Out, OFF Light On, ALT SYS C Selected
Figure 107

EFFECTIVITY: ALL

32-44-00
Page 109
Mar 15/81

0018

LOCKHEED
MAINTENANCE MANUAL



PREREQUISITES

Electrical Power on (24-00-00)
LANDING GEAR control lever DOWN
ANTISKID Monitor ON/OFF switch latched in
Parking Brakes off
ECU LAMPS test OK
CB's in: CB2-F22, G18, G22

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R
R

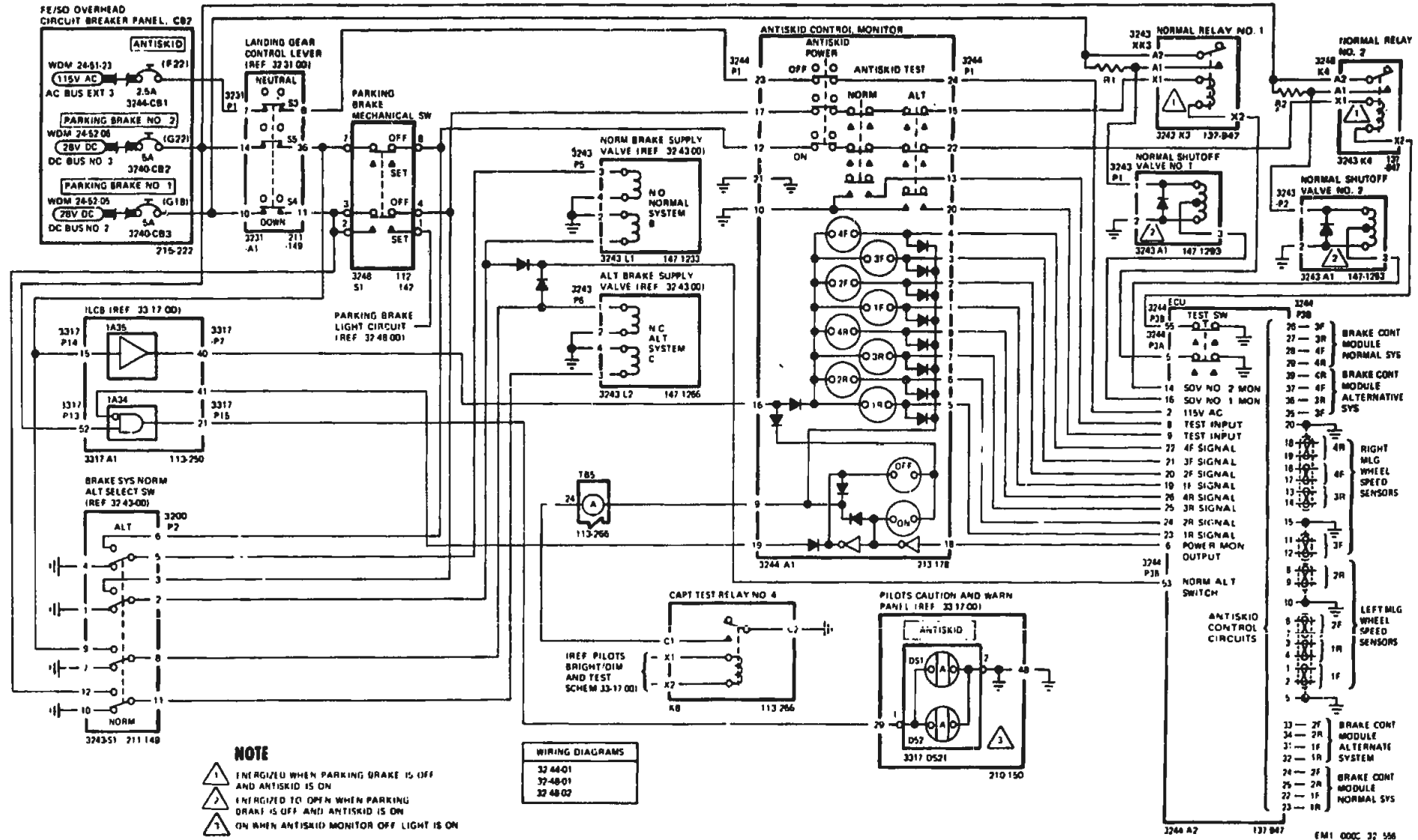
System Will Test With ALT SYS C Selected
Figure 108

EFFECTIVITY: ALL

0018

32-44-00
Page 110
Mar 15/81

LOCKHEED
MAINTENANCE MANUAL



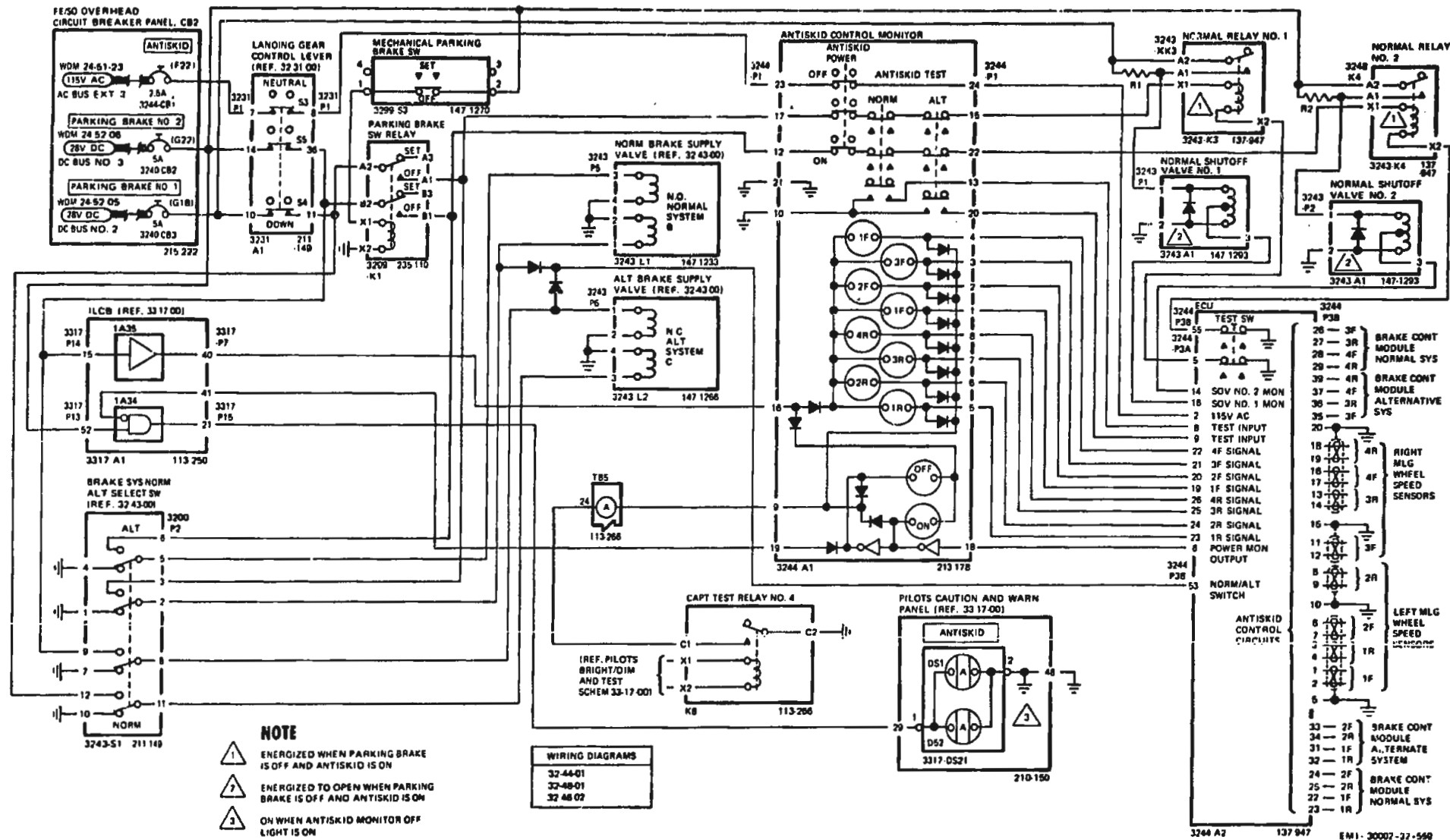
Antiskid Control Power Electrical Schematic
SCHEM 1

EFFECTIVITY: 001-014

32-44-00
Page 111/112
Nov 15/81

001B

LOCKHEED
MAINTENANCE MANUAL



Antiskid Control Power Electrical Schematic
SCHEM 1

EFFECTIVITY: 015-031 WITHOUT SB32-179

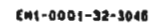
32-44-00
Page 113/114
Nov 15/82

001B



Antiskid Control Power Electrical Schematic
SCHEM 1

32-44-00
Page 115/116
Nov 15/82



ANTISKID CONTROL SYSTEM - ADJUSTMENT AND TEST**1. General**

The tests contained in this adjustment and test procedure consist of the following:

Antiskid system pilots monitor built-in test equipment (BITE) performed by the pilot to determine that the system is in operating condition.

Antiskid system electronic control unit (ECU) built-in test equipment (BITE), performed by flight crew, if the pilots monitor test does not obtain satisfactory results, or by line maintenance personnel during maintenance periods.

Wheel speed sensor spin-up operational test.

2. Equipment and Materials

Aluminum shim 0.10-inch thick with safety streamer (3 required)

RAT Ground Safety Lock - P/N 1304565

3. Referenced Procedures

10-10-00 Parking - Maintenance Practices

24-00-00 Electrical Power - Maintenance Practices

32-63-00 Air/Ground Sensing - Maintenance Practices

4. Adjustment/Test**A. Preliminary Procedures**

- (1) Ensure landing gear control lever is in DOWN position.
- (2) Place chocks forward and aft of main landing gear (MLG) wheels (Ref. 10-10-00).
- (3) Ensure that electrical power is on (Ref. 24-00-00).
- (4) Ensure that parking brakes are off.
- (5) Ensure that pilots center instrument panel, zone 210, BRAKE SYS SELECT switch is in NORM SYS B position.

R EFFECTIVITY: ALL

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32-44-00

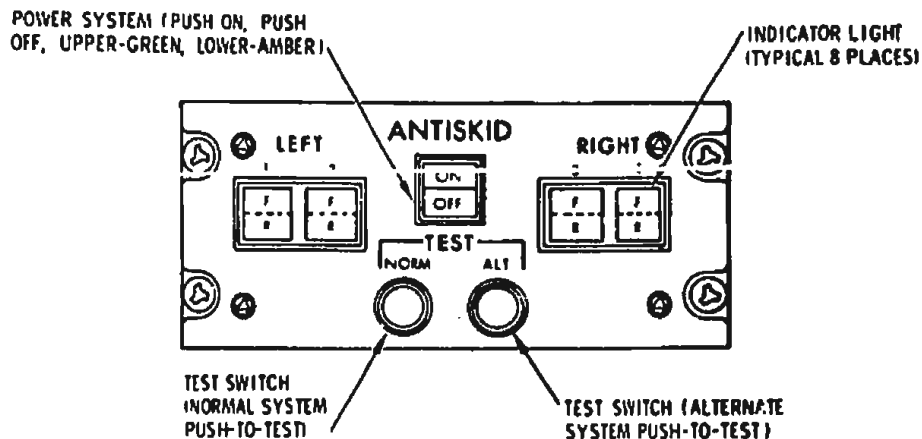
Page 501
Aug 15/82

LOCKHEED
MAINTENANCE MANUAL

- (6) Depress control monitor power switch so that ON light comes on.

B. Pilots Control Monitor BITE Test

- (1) Depress control monitor power switch so that OFF light comes on (Ref. Fig. 501). Observe that ANTISKID caution light comes on.
- (2) Depress control monitor power switch so that ON light comes on. Observe that pilots annunciator ANTISKID caution light goes off.
- (3) Depress and hold control monitor TEST NORM pushbutton. LEFT 1F, 2F, 1R, 2R and RIGHT 3F, 4F, 3R, 4R indicator lights should come on. Release pushbutton. LEFT 1F, 2F, 1R, 2R and RIGHT 3F, 4F, 3R, 4R lights should go off.
- (4) Depress and hold control monitor TEST ALT pushbutton. Indicator light should show the same results as Step 4B(3). Release pushbutton, lights should go off.
- (5) Apply parking brakes. Control monitor power switch light should indicate OFF and pilots annunciator ANTISKID caution light should come on.



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Pilots Antiskid Control Monitor
Figure 501

R EFFECTIVITY: ALL
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0018

32-44-00
Page 502
Aug 15/82



- (6) On aircraft 015-031 without SB32-179 and 001-014, 032-999, position BRAKE SYS SELECT switch to ALT SYS C position. Control monitor power switch light should indicate ON.
- (6) On aircraft 015-031 with SB32-179, proceed to Step 4B(8).
- (7) Position BRAKE SYS SELECT switch to NORM SYS B position. Control monitor power switch light should indicate OFF.
- (8) Release parking brakes. Control monitor power switch should indicate ON.
- (9) Turn off electrical power as required (Ref. 24-00-00).

C. Electronic Control Unit (ECU) BITE Test

NOTE: The following test is for the purpose of testing the antiskid system components during maintenance fault isolation procedures or as an alternate point for the purpose of checking out the system.

During routine system checks, if the pilots control monitor BITE test, Steps 4B(1) through 4B(10), has been performed with no fault indications, the following test is not required. If the monitor BITE test showed abnormal conditions, the following test verifies wiring from the ECU to the pilots monitor and also indicates component failures.

- (1) Perform Steps 4A(1) through 4A(6).
- (2) Perform line maintenance check in accordance with Table 501 (Ref. Fig. 502).

LOCKHEED
MAINTENANCE MANUAL

Line Maintenance Check
Table 501

CONTROL	POSITION	NORMAL RESPONSE
1. <u>Lamps Test</u>		
Selector Switch	LAMPS	
TEST Switch	Depress and hold for test	All eight indicator lights and FAULT light are on
2. <u>System Test</u>		
Selector Switch	SYSTEM NORM	
TEST Switch	Depress and hold for test	All eight indicator lights are on
Selector Switch	SYSTEM ALT.	
TEST Switch	Depress and hold for test	All eight indicator lights are on
3. <u>Shutoff Valve Test</u>		
Selector Switch	SHUTOFF V NORM	
TEST Switch	Depress and hold for test	All eight indicator lights are on
4. <u>Antiskid Valve Test</u>		
Selector Switch	ANTISKID V NORM	
TEST Switch	Depress and hold for test	All eight indicator lights are on
Selector Switch	ANTISKID V ALT	
TEST Switch	Depress and hold for test	All eight indicator lights are on
5. <u>Sensor Test</u>		
Selector Switch	SENSOR	

R EFFECTIVITY: ALL
R
0018

32-44-00
Page 504
Aug 15/82



MAINTENANCE MANUAL

Line Maintenance Check (Cont)
Table 501

CONTROL	POSITION	NORMAL RESPONSE
TEST Switch	Depress and hold for test	All eight indicator lights are on

(3) On pilots overhead panel, place ANTISKID control monitor power switch to OFF as required.

(4) Turn off electrical power as required (Ref. 24-00-00).

D. Wheel Speed Sensor Spin-up Operational Test

R (1) Perform Steps 4A(1) through 4A(6).

(2) Remove wheel hubcap attaching bolts.

C (3) Apply brakes and hold. Do not set parking brakes.
C Control monitor indicator lights are off.

(4) One at a time, grasp each hubcap with two hands and rotate rapidly (0.20 second) for one half turn. Observe that associated brake releases momentarily at the end of hubcap rotation, and that the associated pilots control monitor indicator light comes on momentarily.

NOTE: If control monitor light fails to come on, check if O-ring is installed in hubcap and if so remove. Remove all residual grease from hubcap and its mating surface. Repeat Step (4).

(5) Position BRAKE SYS SELECT switch to ALT SYS C.

(6) Repeat Step (4) for each wheel.

(7) Release brakes.

(8) Secure hubcaps to wheels.

(9) Position BRAKE SYS SELECT switch to NORM SYS B.

(10) Depress control monitor power switch so that OFF light comes on.

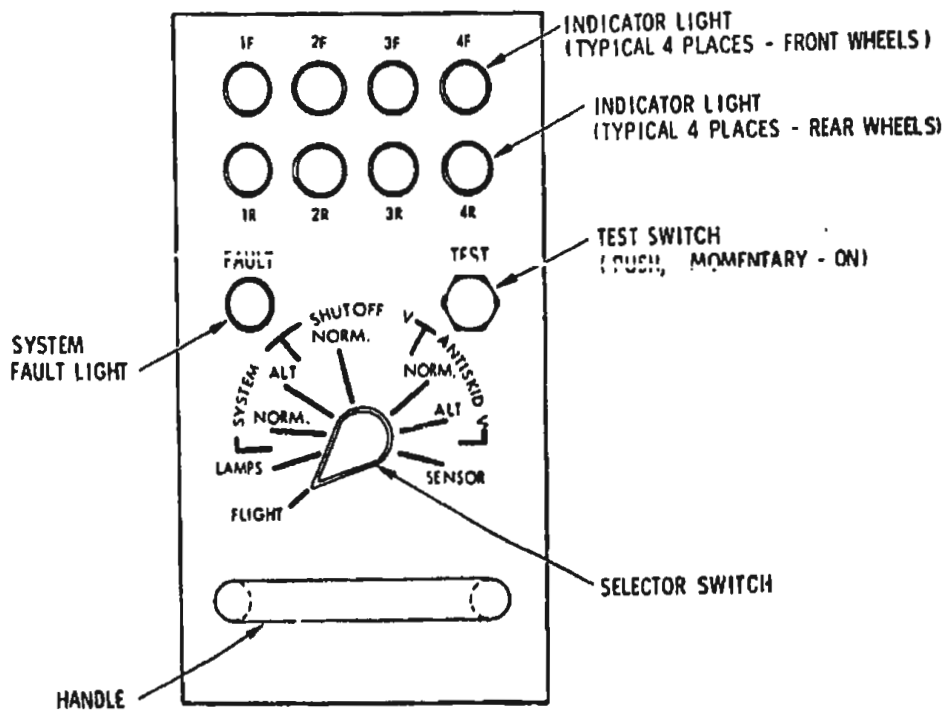
(11) Turn off electrical power as required (Ref. 24-00-00).

EFFECTIVITY: ALL

LOCKHEED



MAINTENANCE MANUAL



ECU Front Panel
Figure 502

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R EFFECTIVITY: ALL
R
001B

32-44-00
Page 506
Aug 15/82

**BRAKE CONTROL MODULE - REMOVAL AND INSTALLATION****1. Referenced Procedures**

- 24-00-00 Electrical Power - Maintenance Practices
- 29-11-00 Hydraulic Power System - Maintenance Practices
- 32-10-00 Main Landing Gear Inboard Door - Maintenance Practices
- 32-43-00 Main Landing Gear Brake System - Maintenance Practices
- R 32-44-00 Antiskid Control System - Adjustment and Test

2. Removal/Installation**A. Removal**

- (1) Turn on electrical power (Ref. 24-00-00).

CAUTION: MAIN LANDING GEAR WHEELS MUST BE CHOCKED FORWARD AND AFT BEFORE REDUCING BRAKE SYSTEM PRESSURE.

- (2) Turn off applicable hydraulic system B or C pressure (Ref. 29-11-00).
- (3) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, ensure that circuit breakers PARKING BRAKE NO. 1 (G18), PARKING BRAKE NO. 2 (G22) and BRAKE PRESS IND (G21) are closed.
- (4) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag GEAR - BRAKE - ANTISKID (F22) circuit breaker.
- (5) On pilots center instrument panel, zone 210, place BRAKE SYS SELECT switch to NORM SYS B or ALT SYS C position, as applicable.
- (6) Pump brake pedals until applicable normal or alternate brake pressure is 0 psi.
- (7) Open applicable main landing gear (MLG) inboard door and install inboard door actuator lock (Ref. 32-10-00).
- (8) Open lower wing access panel 541AB or 641AB, as applicable.

EFFECTIVITY: ALL

32-44-01
Page 401
Jun 15/94



- R (9) Disconnect electrical connector from antiskid valves (Ref. Fig. 401). Cap antiskid valve receptacles.
- R (10) Disconnect hydraulic pressure, return, and four brake lines from module. Cap all lines and install protective port plugs in module.
- R (11) Support module while removing three MS21075L4 bolts and flat washers.
- R (12) Remove module.
- R (13) Turn off electrical power (Ref. 24-00-00).

B. Installation

- (1) Verify that circuit breaker opened in Step 2A(4) is open and tagged.
- (2) Position module and secure with three MS21075L4 bolts and flat washers.
- (3) Remove protective port plugs from module and protective caps from hydraulic line fittings.
- (4) Connect hydraulic pressure, return, and four brake lines to module.
- (5) Remove protective caps from antiskid valve receptacles, and connect electrical connectors to antiskid valves.
- (6) Turn on electrical power (Ref. 24-00-00).
- (7) On pilots center instrument panel, zone 210, place BRAKE SYS SELECT switch in NORM SYS B or ALT SYS C position, as applicable.
- (8) Remove tag and close circuit breaker opened in Step 2A(4).
- (9) Ensure that circuit breakers called out in Step 2A(3) are closed.

EFFECTIVITY: ALL

001B

32-44-01
Page 402
Feb 15/74



MAINTENANCE MANUAL

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

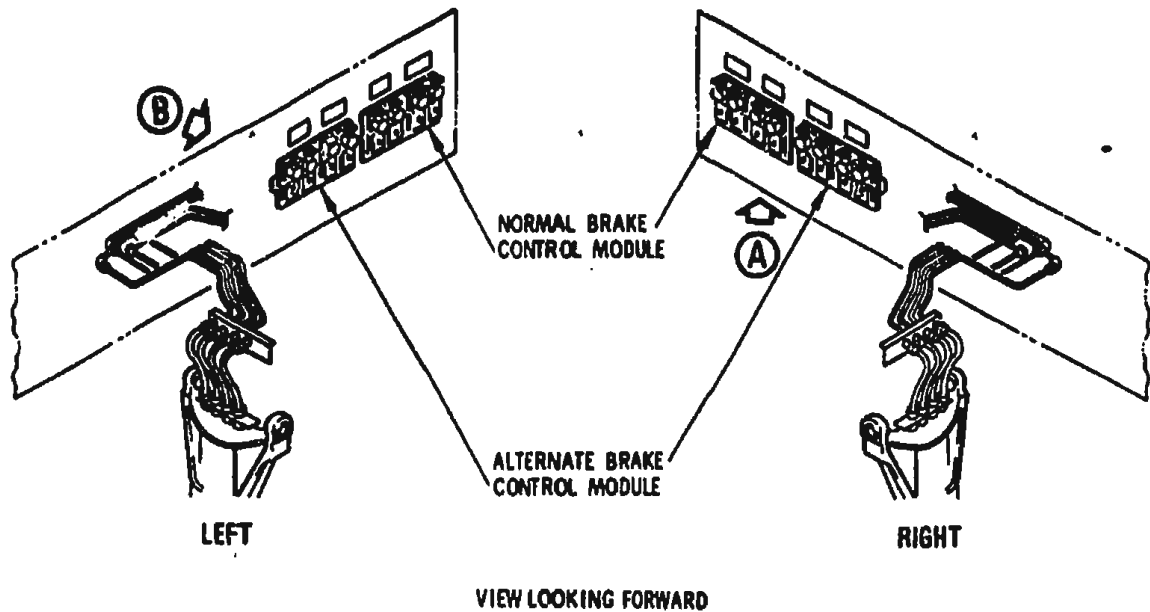
- (10) Turn on applicable hydraulic system B or C pressure (Ref. 29-11-00).
- (11) Check module hydraulic fittings for leaks.
- (12) Bleed brake system (Ref. 32-43-00).
- R (13) Perform Antiskid Control System Pilots Control Monitor
R BITE Test (Ref. 32-44-00)
- R (14) Turn off applicable hydraulic system B or C pressure
R (Ref. 29-11-00).
- R (15) Turn off electrical power (Ref. 24-00-00).
- R (16) Close 541AB or 641AB wing access panel, as applicable.
- R (17) Close MLG inboard door (Ref. 32-10-00).

EFFECTIVITY: ALL

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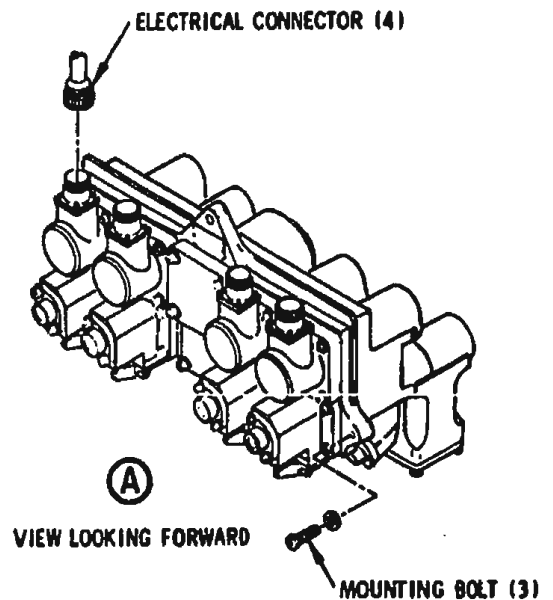
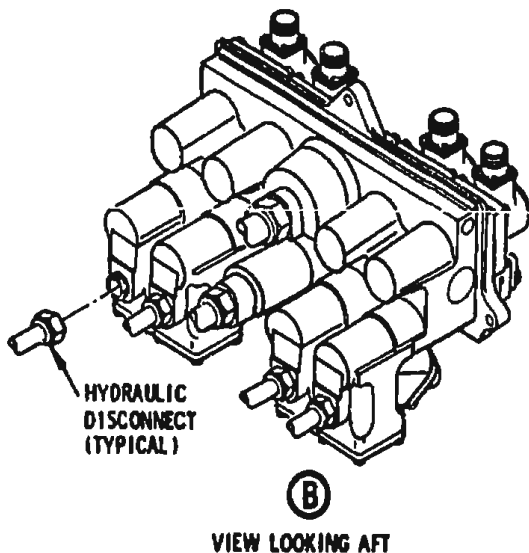
32-44-01
Page 403
Jun 15/94

LOCKHEED
MAINTENANCE MANUAL



NOTE

ALL HYDRAULIC LINES ARE TO BE DISCONNECTED AND THE LINES PLUGGED. CAPS ARE TO BE INSTALLED ON ALL MODULE HYDRAULIC FITTINGS AND ELECTRICAL CONNECTORS



M1-0002-32-105

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Brake Control Module - Removal and Installation
Figure 401

EFFECTIVITY: ALL

001B

32-44-01
Page 404
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL

ANTISKID CONTROL VALVE - REMOVAL AND INSTALLATION

1. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent
Hydraulic fluid, LAC Specification C-34-1224, Type III, or equivalent

2. Referenced Procedures

- | | |
|------------|--|
| 24-00-00 | Electrical Power - Maintenance Practices |
| 29-11-00 | Hydraulic Power System - Maintenance Practices |
| 32-10-00 | Main Landing Gear Inboard Door - Maintenance Practices |
| 32-43-00 | Brake System - Maintenance Practices |
| R 32-44-00 | Antiskid Control System - Adjustment and Test |

3. Removal/Installation

A. Removal

- (1) Turn off applicable hydraulic system B or C pressure (Ref. 29-11-00).
- (2) Turn on electrical power (Ref. 24-00-00).
- (3) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag GEAR - BRAKE - ANTISKID circuit (F22) circuit breaker.
- (4) On pilots center instrument panel, zone 210, place BRAKE SYS SELECT switch in NORM SYS B or ALT SYS C position, as applicable.

CAUTION: MAIN LANDING GEAR WHEELS MUST BE CHOCKED FORWARD AND AFT BEFORE REDUCING BRAKE SYSTEM PRESSURE.

- (5) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, ensure that circuit breakers PARKING BRAKE NO. 1 (G18), PARKING BRAKE NO. 2 (G22), and BRAKE PRESS IND (G21) are closed.

EFFECTIVITY: ALL

001B

32-44-02
Page 401
Jun 15/94



MAINTENANCE MANUAL

- (6) Pump brake pedals until applicable normal or alternate brake system pressure is 0 psi.
- (7) Open applicable main landing gear (MLG) inboard door and install inboard door actuator lock (Ref. 32-10-00).
- (8) Open lower wing access panel 541AB or 641AB, as applicable.
- (9) Disconnect electrical connector from antiskid valve (Ref. Fig. 401). Cap valve electrical connector.
- (10) Remove screws and washers securing valve to module.
- (11) Pull valve out of module.
- (12) Install protective port plugs in module.
- (13) Turn off electrical power (Ref. 24-00-00).

B. Installation

- (1) Verify that circuit breaker opened in Step 3A(3) is open and tagged.
- (2) Check packings and cap ring for condition and seating in grooves.
- (3) Lubricate packings and cap ring with hydraulic fluid.
- (4) Remove protective port plugs from module and insert valve into module.
- (5) Align valve and secure with screws and washers.
- (6) Torque screws 120 lb in. and lock-wire screws.
- (7) Remove protective cap from valve electrical connector and connect electrical connector to valve.
- (8) Turn on electrical power (Ref. 24-00-00).
- (9) Remove tag and close circuit breaker opened in Step 3A(3).

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001B

EFFECTIVITY: ALL

32-44-02
Page 402
Jun 15/94



MAINTENANCE MANUAL

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

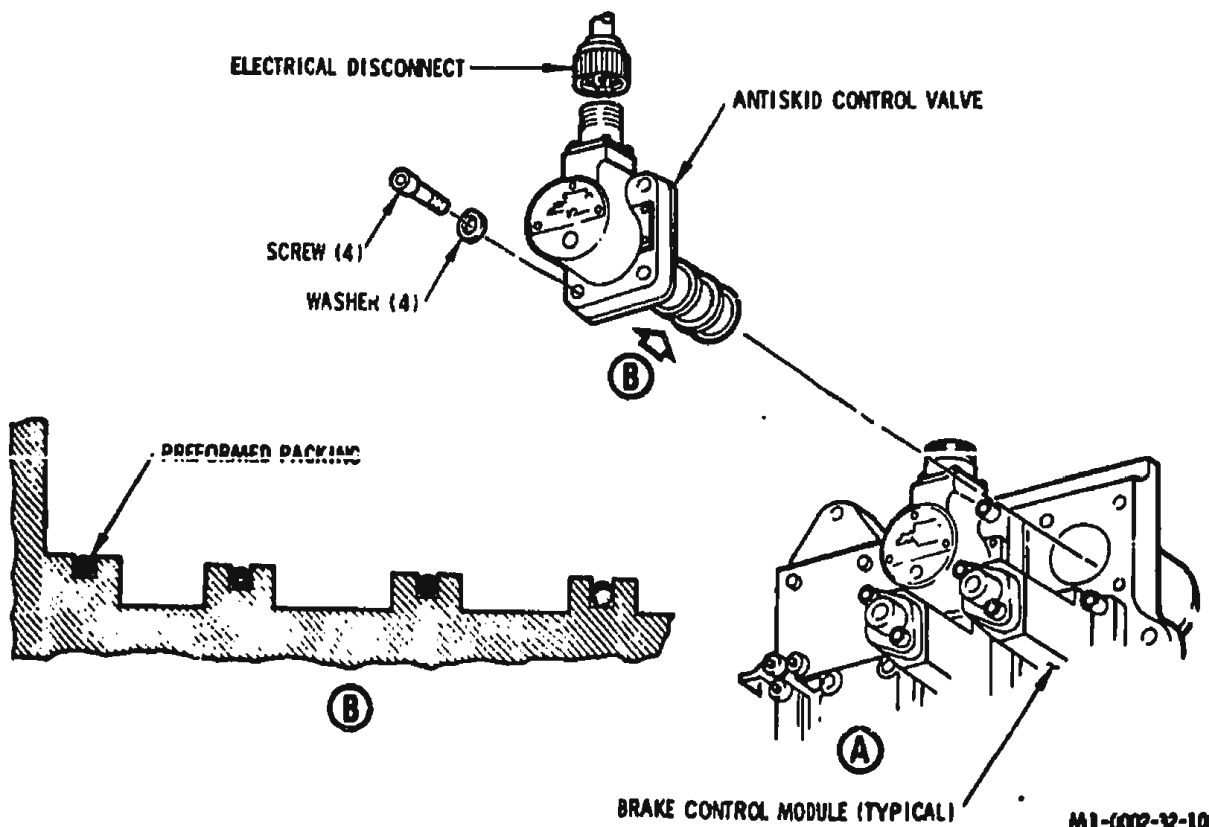
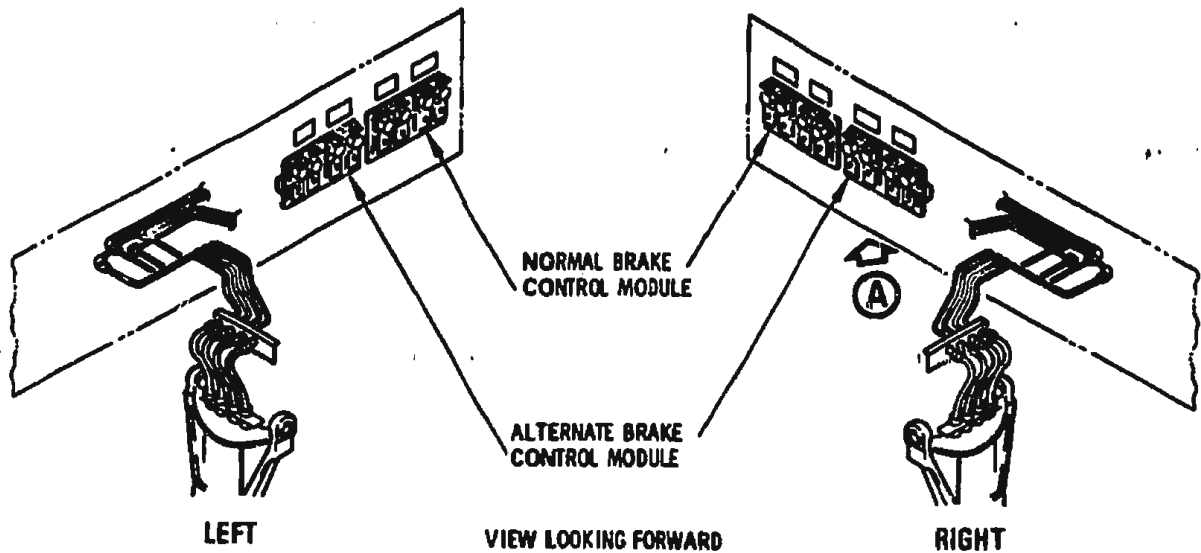
- (10) Turn on applicable hydraulic system B or C pressure (Ref. 29-11-00).
- (11) Check antiskid control valve for leaks.
- (12) Bleed brake system (Ref. 32-43-00).
- R (13) Perform Antiskid Control System Pilots Control Monitor
R BITE Test (Ref. 32-44-00).
- R (14) Turn off applicable hydraulic system B or C pressure
R (Ref. 29-11-00).
- R (15) Turn off electrical power (Ref. 24-00-00).
- R (16) Close wing access panel 541AB or 641AB, as applicable.
- R (17) Close applicable MLG inboard door (Ref. 32-10-00).

EFFECTIVITY: ALL

001B

32-44-02
Page 403
Jun 15/94

LOCKHEED
MAINTENANCE MANUAL



Antiskid Control Valve - Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-44-02
Page 404
Mar 15/83

001B



R PARKING BRAKE RETURN SHUTOFF VALVE - REMOVAL AND INSTALLATION

R 1. Equipment and Materials

- R Lock-wire, QQ-W-390, 0.020-inch diameter, or equivalent
- R Hydraulic Fluid, LAC Spec C-34-1224, Type III, or equivalent
- R Container, two quart capacity, or equivalent
- R O-ring Packing, Goodyear Part No. 6000168, or equivalent
- R O-ring Packing, Goodyear Part No. 6000169, or equivalent
- R Cap Ring, Goodyear Part No. 6000158, or equivalent
- R Cap Ring, Goodyear Part No. 6001465, or equivalent

R 2. Referenced Procedures

- R 24-00-00 Electrical Power - Maintenance Practices
- R 29-11-00 Hydraulic Power System - Maintenance Practices

R 3. Removal/Installation

R A. Removal

- R (1) Turn off hydraulic systems B and C pressure (Ref. 29-11-00).
- R (2) Turn on electrical power (Ref. 24-00-00).
- R (3) On pilots center instrument panel, zone 210, position BRAKE SYS SELECT switch to NORM SYS B.
- R (4) Depress brake pedals repeatedly until BRAKE PRESS gage indicates 0 psi for system B.
- R (5) Position BRAKE SYS SELECT switch to ALT SYS C.
- R (6) Depress brake pedals repeatedly until BRAKE PRESS gage indicates 0 psi for system C.
- R (7) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag applicable PARKING BRAKE NO. 1 (G18) or PARKING BRAKE NO. 2 (G22) circuit breaker.

R EFFECTIVITY: ALL

32-44-03
Page 401
Aug 15/76



MAINTENANCE MANUAL

NOTE: G18 supplies power to normal shutoff valve No. 1 (L-left). G22 supplies power to normal shutoff valve No. 2 (R-right).

- (8) Disconnect applicable shutoff valve electrical connector (Ref. Fig. 401).
- (9) Position container under valve to catch spilling hydraulic fluid and remove bolts securing valve to manifold.
- (10) Remove valve.

B. Installation

- (1) Inspect manifold valve port for cleanness and surface deformation.
- (2) Inspect shutoff valve O-rings and cap rings for damage and deformation. Replace as required (Ref. Fig. 401).
- (3) Coat O-rings and cap rings with hydraulic fluid and insert valve body into manifold port.
- (4) Install bolts and secure with lock-wire.
- (5) Install electrical connector on valve that was replaced and disconnect electrical connector on valve that was not replaced.
- (6) Close circuit breaker opened in Step A(7).
- (7) Verify that electrical power is on (Ref. 24-00-00) and turn on antiskid.

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

TRAVEL AREAS OF ALL FLIGHT CONTROL SURFACES AND MAIN GEAR DOORS ARE CLEAR OF PERSONNEL AND GROUND EQUIPMENT.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (8) Turn on hydraulic system B pressure (Ref. 29-11-00).
- (9) Verify that BRAKE SYS SELECT switch is in NORM SYS B position.

EFFECTIVITY: ALL

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32-44-03
Page 402
Jun 15/93

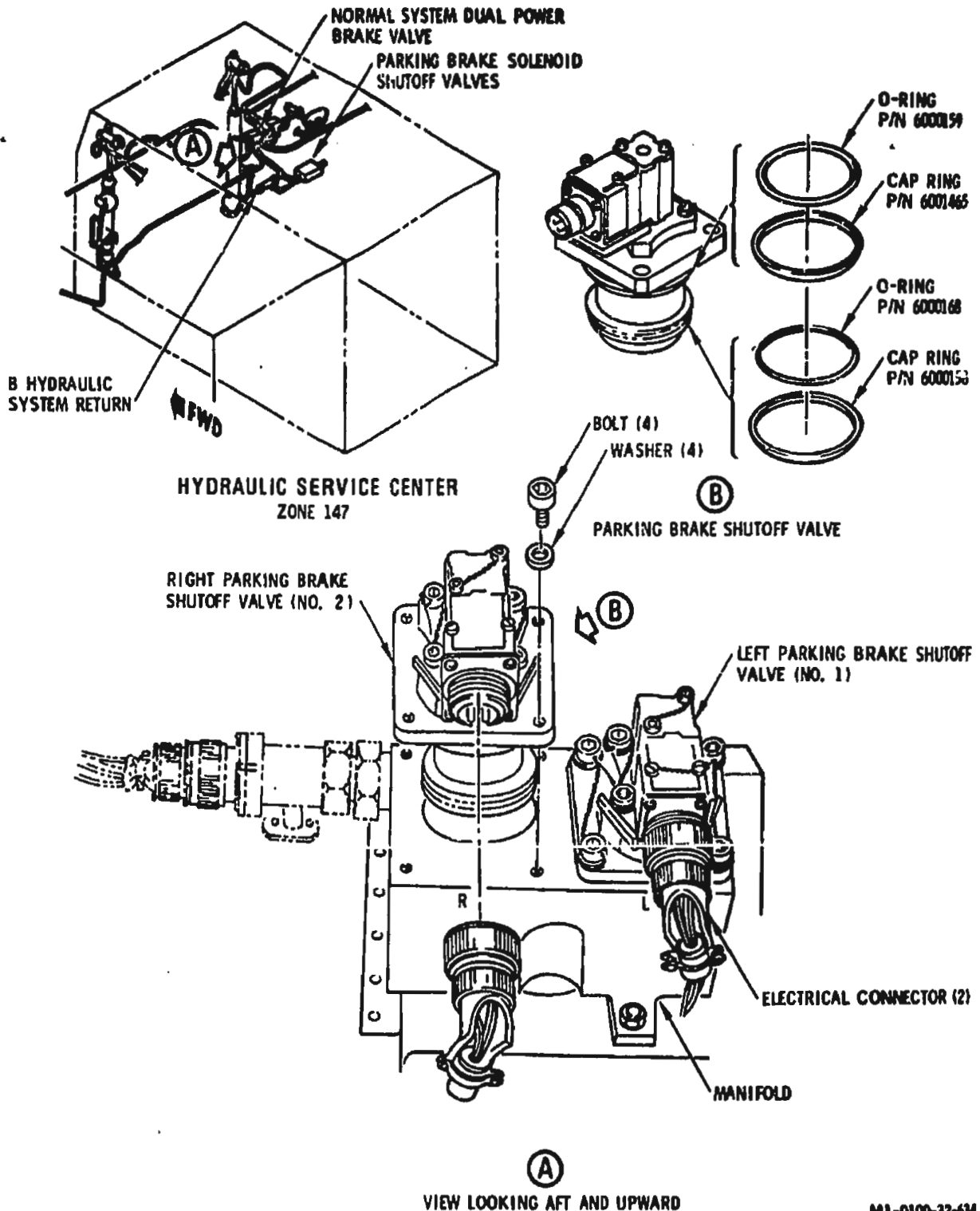


MAINTENANCE MANUAL

- (10) On BRAKE PRESS gage verify normal brake pressure.
- (11) Apply parking brakes.
- (12) Turn off hydraulic system B pressure (Ref. 29-11-00). BRAKE PRESS must not noticeably decrease in 10-minute period.
- (13) Open PARKING BRAKE NO. 1 (G18) and PARKING BRAKE NO. 2 (G22).
- (14) Release parking brakes. Depress brake pedals fully and hold until brake pressure stabilizes.
- R (15) Close circuit breakers G18 and G22. BRAKE PRESS must decrease noticeably.
- R (16) Open circuit breakers G18 and G22. Connect electrical connector disconnected in Step 3.B.(5). Close circuit breakers G18 and G22.
- R
- (17) Check valve and manifold for evidence of hydraulic leakage.
- (18) Turn off electrical power (Ref. 24-00-00).
- (19) Turn off antiskid as required.

EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-634

R Parking Brake Return Shutoff Valve - Removal and Installation
R Figure 401

R EFFECTIVITY: ALL

001B

32-44-03
Page 404
Aug 15/76

LOCKHEED
MAINTENANCE MANUAL

ANTISKID WHEEL SPEED SENSOR AND HUB (DRIVE) CAP ASSEMBLY
REMOVAL AND INSTALLATION

1. Referenced Procedure

32-44-00 Antiskid System - Adjustment and Test

2. Removal/Installation

A. Removal

- (1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker BRAKE ANTISKID (F22).
- (2) Remove mounting bolts and hub (drive) cap assembly to gain access to sensor (Ref. Fig. 401).
- (3) Remove mounting screws securing sensor to adapter.

CAUTION: SENSOR MAY BE DIFFICULT TO REMOVE AND CAUTION MUST BE EXERCISED TO PREVENT DAMAGE TO SENSOR AND SENSOR ELECTRICAL CONNECTOR.

- (4) Thread mounting screws into EXTRACT holes of sensor and apply slight tension to screws to withdraw sensor from axle. If sensor is not easily withdrawn, the locally fabricated extractor bar must be used to remove sensor as follows:
 - (a) Position extractor bar and thread extractor bolts, with nuts installed, into EXTRACT holes of sensor.
 - (b) Tighten nuts on extractor bolts evenly against extractor bar until sensor is withdrawn from adapter.
- (5) Disconnect electrical connector from sensor.

B. Installation

CAUTION: LOCKWIRE CONNECTOR TO SENSOR TO PREVENT CONNECTOR FROM BACKING OFF.

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- (1) Assure wire bundle clamp is installed, see Figure 401, and connect electrical connector to sensor.
- (2) Thread mounting screws into EXTRACT holes of sensor to serve as handles.

EFFECTIVITY: ALL

32-44-04
Page 401
Nov 15/89

001B



MAINTENANCE MANUAL

- (3) Insert sensor into wheel axle and align sensor MOUNT holes with mounting holes in adapter.

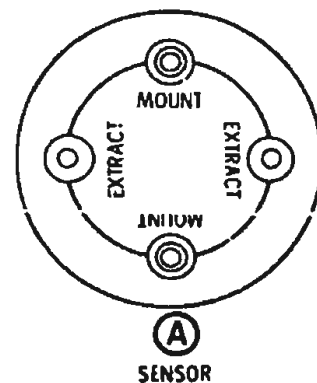
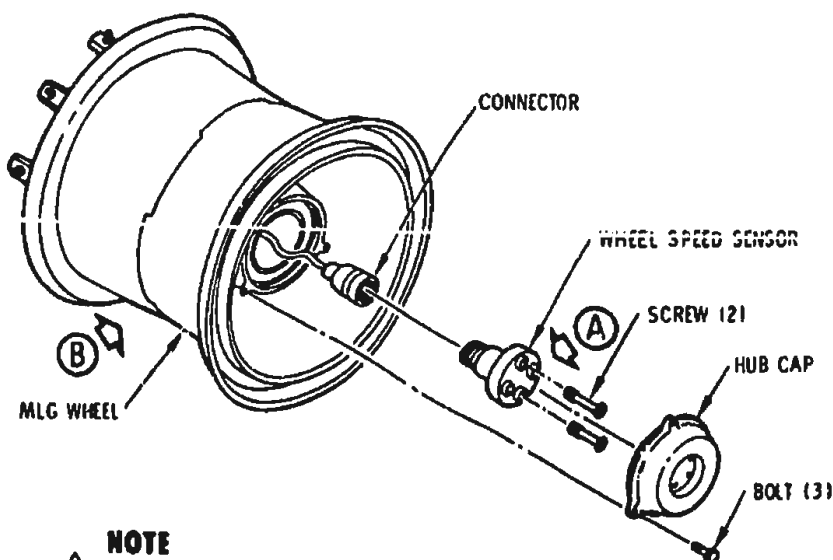
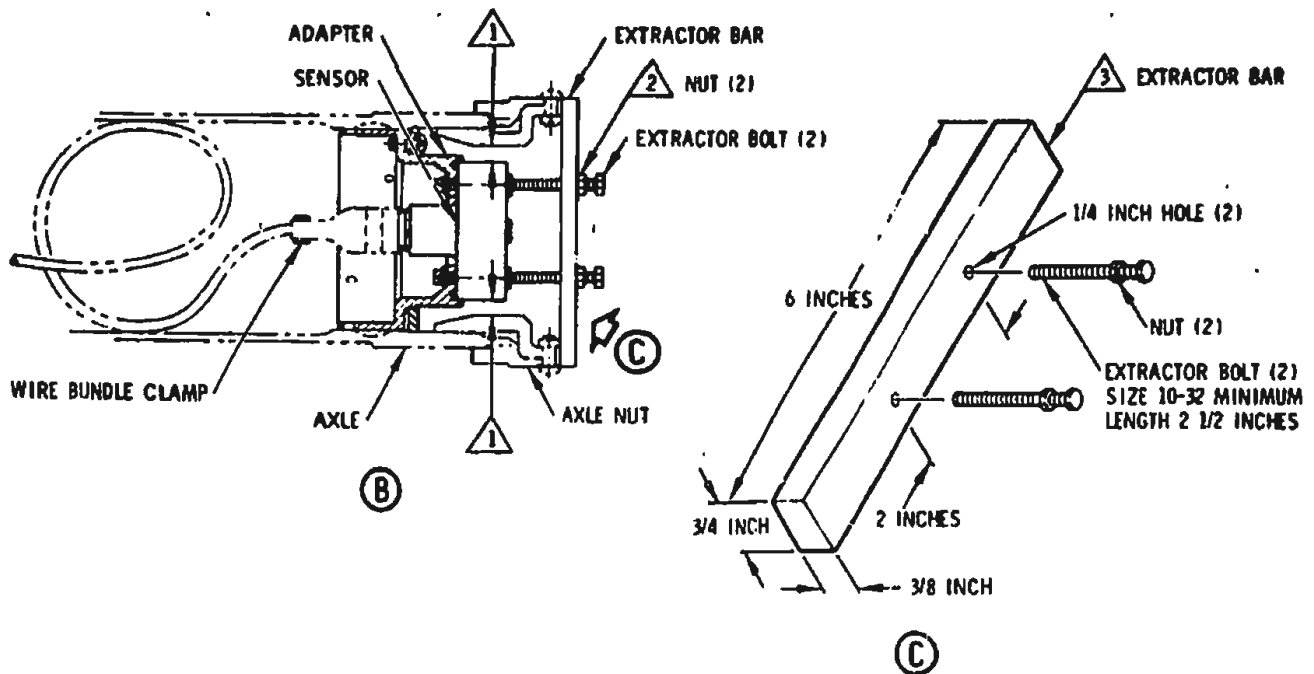
CAUTION: WHEN A MOUNTING SCREW IS REPLACED, ENSURE THAT REPLACEMENT SCREW IS NONMAGNETIC.

- (4) Remove mounting screws from EXTRACT holes and insert into MOUNT holes.

CAUTION: CARE MUST BE EXERCISED TO ENSURE THAT SENSOR IS NOT COCKED DURING INSTALLATION TO PREVENT DAMAGE TO SENSOR.

- (5) Tighten screws simultaneously until sensor is seated into adapter.
- (6) Using a feeler gage, check clearance between sensor and axle nut in four equally spaced positions around sensor. Clearance must be 0.342 inch minimum to 0.384 inch maximum (Ref. Fig. 401).
- (7) Install hub (drive) cap assembly and secure with mounting bolts.
- (8) Remove tag and close circuit breaker opened in Step 2A(1).
- (9) Perform antiskid system operational test (Ref. 32-44-00).

LOCKHEED
MAINTENANCE MANUAL



- NOTE**
- ① CHECK CLEARANCE FOUR PLACES:
0.342 MINIMUM, 0.384 MAXIMUM
 - ② TIGHTEN NUTS SIMULTANEOUSLY AGAINST
EXTRACTOR BAR TO WITHDRAW SENSOR
 - ③ MAKE FROM STEEL

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Wheel Speed Sensor - Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-44-04
Page 403/404
Jul 15/83

001B

FLIGHT STATION ANTISKID CONTROL MONITOR - MAINTENANCE PRACTICES1. General

In the event the pilots control monitor test procedure shows an inoperative condition, the electronic control unit (ECU) BITE test can be used to verify whether or not the antiskid system is operative.

2. Referenced Procedure

32-44-00 Antiskid Test System - Adjustment and Test

3. Maintenance PracticesA. Test Procedure

- (1) Perform ECU BITE test (Ref. 32-44-00).

B. Deactivation

NOTE: This deactivation procedure applies only when an aircraft is to be dispatched in accordance with the MEL.

- (1) Placard the pilots control monitor as being inoperative.
- (2) Make appropriate entry in aircraft log book.

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EFFECTIVITY: ALL

0016

32-44-05
Page 201/202
Aug 15/82

LOCKHEED
MAINTENANCE MANUAL

FLIGHT STATION ANTISKID CONTROL MONITOR - REMOVAL AND INSTALLATION

1. Referenced Procedure

32-44-00 Antiskid System - Adjustment and Test

2. Removal/Installation

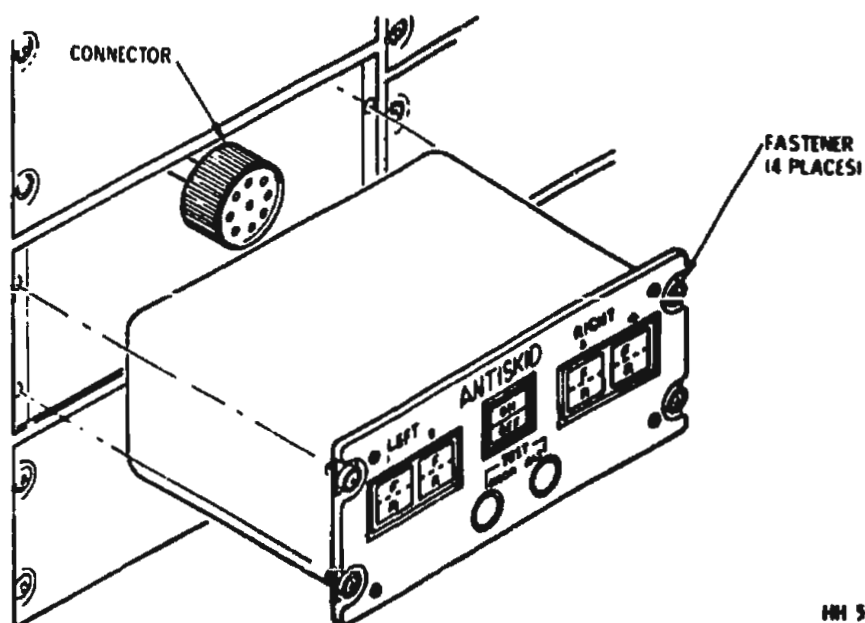
A. Removal

- (1) On Flight Engineer/Second Officers overhead circuit breaker panel, zone 215, open and tag BRAKE ANTISKID circuit breaker.
- (2) Release turnlock fasteners on front of pilots control monitor panel, zone 215, and slide monitor free of mounting (Ref. Fig. 401).
- (3) Disconnect cable at bayonet connector at rear of panel.
- (4) Place protective cap on panel receptacle.

B. Installation

- (1) Remove protective cap from panel receptacle and connect cable to panel.
- (2) Position panel in mounting and secure in place with turnlock fasteners.
- (3) Remove tag and close BRAKE ANTISKID circuit breaker.
- (4) Perform antiskid system operational test (Ref. 32-44-00).

LOCKHEED
MAINTENANCE MANUAL



MM 5192
M1-0101-32-111

Flight Station Antiskid Control Monitor - Removal and Installation
Figure 401

EFFECTIVITY: ALL

050B

32-44-05
Page 402
Dec 1/71

LOCKHEED
MAINTENANCE MANUAL

SYSTEM ELECTRONIC CONTROL UNIT (ECU)
REMOVAL AND INSTALLATION

1. Referenced Procedure

32-44-00 Antiskid System - Adjustment/Test

1. Removal/Installation

A. Removal

- (1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag BRAKE ANTISKID circuit breaker.
- (2) Loosen wingnut clamps securing electronic control unit (ECU) to rack in the mid electrical service center, zone 137. Slide clamps clear of mounting hooks.
- (3) Slide ECU out of rack.

B. Installation

- (1) Support ECU in position and slide into rack until electrical connector is engaged, then press ECU into place.
- (2) Position wingnut clamps to engage mounting hooks of ECU. Tighten wingnuts to secure ECU in place.
- (3) Remove tag and close BRAKE ANTISKID circuit breaker.
- (4) Perform antiskid system operational test (Ref. 32-44-00).

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EFFECTIVITY: ALL

32-44-06
Page 401/402
Jan 15/73

LOCKHEED
MAINTENANCE MANUAL

PRINTED WIRING BOARD (ECU) -- REMOVAL AND INSTALLATION

1. Referenced Procedure

32-44-00 Antiskid System - Adjustment and Test

1. Removal/Installation

A. Removal

- (1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag BRAKE ANTISKID circuit breaker (F22).
- (2) Unfasten screws and swing top cover out of way (Ref. Fig. 401).
- (3) Lift card ejectors at each end of board to separate card from ECU electrical connector, and then lift board out of ECU.

R CAUTION: SOME OF THE INTEGRATED CIRCUIT DEVICES INCLUDED IN THE PRINTED WIRING BOARDS ARE EXTREMELY SUSCEPTIBLE TO STATIC DISCHARGE AND STRAY VOLTAGE DAMAGE. ANY TIME A BOARD IS HANDLED, EXCEPT WHEN BEING TESTED, THE BOARD CONNECTOR LEADS MUST BE SHORTED TOGETHER USING A CONDUCTOR CARRIER SPRING. COMPONENTS AND CONNECTOR LEADS MUST NOT BE TOUCHED WHEN CONDUCTOR CARRIER SPRING IS NOT IN PLACE ON CONNECTOR LEADS. TEST EQUIPMENT MUST BE GROUNDED DURING TEST PROCEDURES. ANY WORK BENCH THAT THE BOARD COMES IN CONTACT WITH MUST BE COVERED WITH CONDUCTING MATERIAL AND MUST BE GROUNDED.

- (4) Short board connector leads together using a conductor carrier spring.

B. Installation

- (1) Inspect ECU electrical connectors and make certain that polarizing insert is in proper position. On connectors J2 through J9, insert should be in position 4; on connectors J10 and J11, insert should be in position 8; and on connector J12, insert should be in position 12.
- (2) Remove conductor carrier spring from board connector leads; insert board into slides so that it mates correctly with ECU connector and polarizing insert.

EFFECTIVITY: ALL

001B

32-44-07
Page 401
Aug 15/81

LOCKHEED



MAINTENANCE MANUAL

NOTE: Control board connectors mate with ECU connectors J2 through J9. Monitor and system test board connectors mate with ECU connectors J10 and J11. Component test board connectors mate with ECU connector J12.

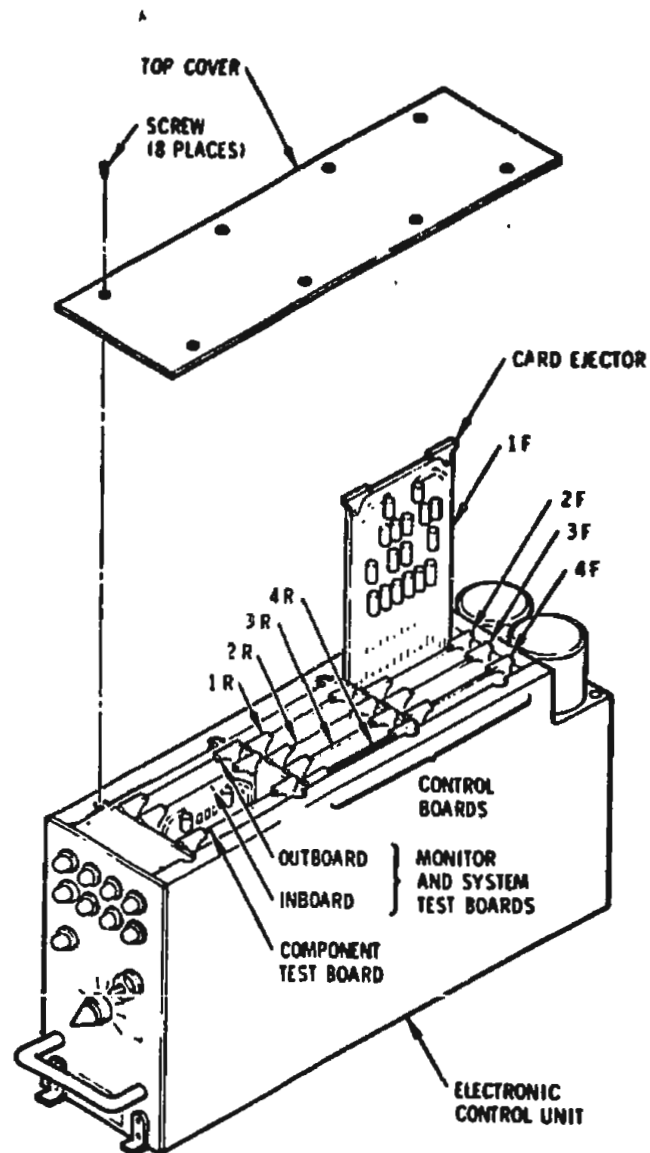
- (3) Slide board down slides of ECU until board connector engages ECU connector, then press on card ejector arms to seat board.
- (4) Close cover and secure with screws.
- (5) Remove tag and close BRAKE ANTISKID circuit breaker.
- (6) Perform antiskid system operational test (Ref. 32-44-00).

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EFFECTIVITY: ALL

32-44-07
Page 402
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



HH 6476
MI-A00-32-104

Printed Wiring Board (ECU) - Removal and Installation
Figure 401

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EFFECTIVITY: ALL

32-44-07
 Page 403/404
 May 15/74

LOCKHEED
MAINTENANCE MANUAL

BRAKE FILTER DIFFERENTIAL PRESSURE INDICATOR
REMOVAL AND INSTALLATION

1. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent
Hydraulic Fluid, LAC Spec C-34-1224, Type III, or equivalent

2. Referenced Procedures

29-11-00 Hydraulic Power System - Maintenance Practices

R 32-10-00 Main Landing Gear Inboard Door - Maintenance
R Practices

32-43-00 Brake System - Maintenance Practices

3. Removal/Installation

A. Removal

R (1) Open applicable main landing gear (MLG) inboard door
R and install inboard door actuator lock (Ref. 32-10-00).

R (2) Turn off applicable hydraulic systems B or C pressure
R (Ref. 29-11-00).

**CAUTION: MAIN LANDING GEAR WHEELS MUST BE CHOCKED
FORWARD AND AFT BEFORE REDUCING BRAKE
PRESSURE.**

R (3) Pump brake pedals until applicable normal or alternate
brake system pressure is 0 psi.

R (4) Remove applicable panel 541AB or 641AB.

R (5) Remove screws and washers securing indicator to module
R (Ref. Fig. 401).

R (6) Grasp indicator head and pull indicator out of module.

R (7) Install protective plug in indicator port of module.

B. Installation

(1) Check packings and retainers to ensure that they are
correctly seated in packing grooves.

EFFECTIVITY: ALL

001B

32-44-13
Page 401
Feb 15/74

LOCKHEED
MAINTENANCE MANUAL

- (2) Lubricate packings with hydraulic fluid, remove protective plug from module, and insert indicator into module.
- (3) Align mounting holes and secure indicator to control module with screws and washers.
- (4) Lock-wire screws.

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

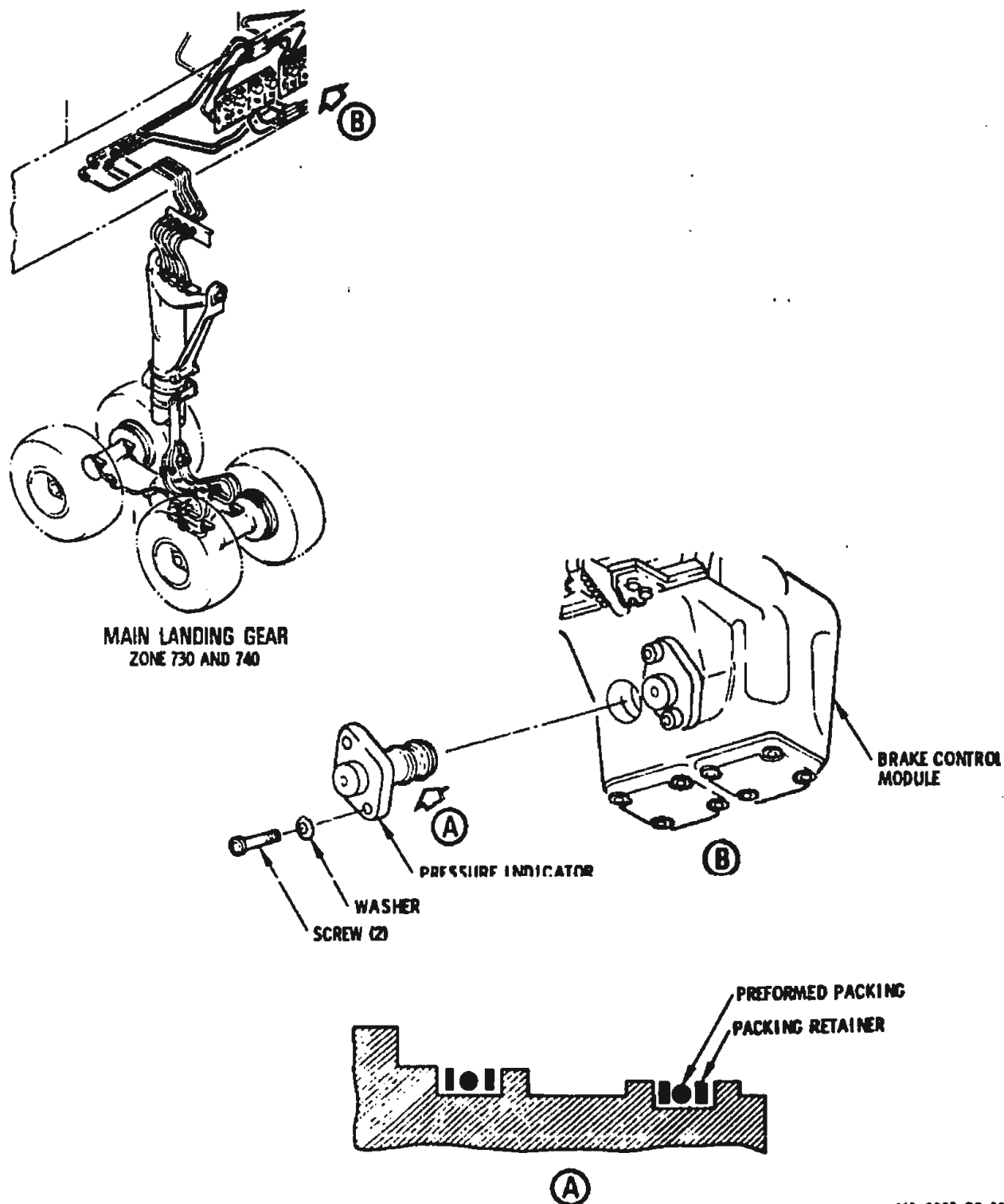
- (5) Turn on applicable hydraulic system B or C (Ref. 29-11-00).
- R (6) Check differential pressure indicator for leaks.
- R (7) Bleed brake system (Ref. 32-43-00).
- R (8) Close wing access panel.
- R (9) Close MLG inboard door (Ref. 32-10-00).

EFFECTIVITY: ALL

001B

32-44-13
Page 402
Feb 15/74

LOCKHEED
MAINTENANCE MANUAL



M1-0001-32-108

Brake Filter Differential Pressure Indicator
Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-44-13
Page 403/404
Dec 15/80

001B

**BRAKE CONTROL MODULE FILTERS - REMOVAL AND INSTALLATION****1. Equipment and Materials**

Lockwire, Fed Spc QQ-W-390, 0.020-inch diameter, or equivalent
Hydraulic fluid, LAC Specification C-34-1224 Type III

2. Referenced Procedures

- | | |
|----------|--|
| 29-11-00 | Hydraulic Power System - Maintenance Practices |
| 32-10-00 | Main Landing Gear Inboard Door - Maintenance Practices |
| 32-43-00 | Main Landing Gear Brake System - Maintenance Practices |

3. Removal/Installation**A. Removal**

Each of the four brake filters and the inlet filter are removed and installed according to these procedures.

- (1) Open applicable main landing gear (MLG) inboard door and install inboard door actuator lock (Ref. 32-10-00).
- (2) Turn off applicable hydraulic system B or C pressure (Ref. 29-11-00).

R CAUTION: MAIN LANDING GEAR WHEELS MUST BE CHOCKED FORWARD AND AFT BEFORE REDUCING BRAKE SYSTEM PRESSURE.

- (3) Pump brake pedals until applicable normal or alternate brake system pressure is 0 psi.
- (4) When removing brake filters, open 541AB or 641AB wing access panel, whichever is applicable.
- (5) Remove screws and washers securing cover plate to module (Ref. Fig. 401).
- (6) Remove cover plate and filter from module.
- (7) Cover filter cavity with cover plate to prevent contamination.

EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL

B. Installation

- (1) Check packing and packing retainers to ensure that they are properly seated in packing grooves.
- (2) Lubricate packing with hydraulic fluid, uncover filter cavity, and insert filter into module. Press filter to fully seated position.
- (3) Replace packing and cap ring seals on cover plate assembly.
- (4) Lubricate packing and cap ring with hydraulic fluid and insert cover plate into module.
- (5) Align mounting holes and secure cover plate to module with screws and washers. Torque screws to 120 lb in.
- (6) Lock-wire screws.
- (7) Reset differential pressure indicators for replaced brake filter as required.

R **WARNING:** VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

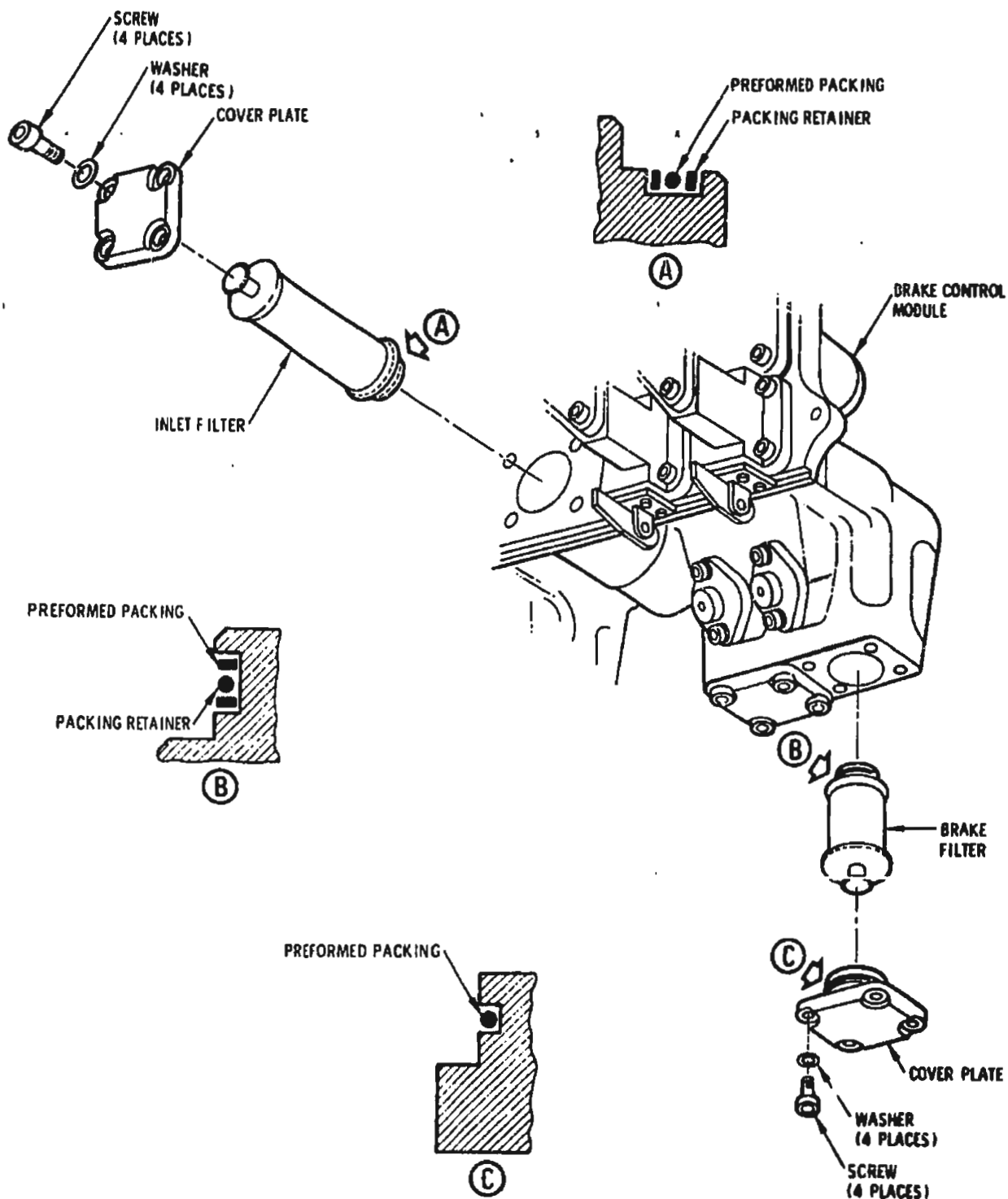
- (8) Turn on applicable hydraulic system B or C pressure (Ref. 29-11-00).
- (9) Check filter for leaks.
- (10) Bleed brake system (Ref. 32-43-00).
- (11) Turn off applicable hydraulic system B or C pressure (Ref. 29-11-00).
- (12) As applicable, close 541AB or 641AB wing access panel (Ref. Step A(6)).
- (13) Close MLG inboard door (Ref. 32-10-00).

EFFECTIVITY: ALL

0018

32-44-14
Page 402
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



HH 5241
M1-A00-32-107

Brake Control Module Filters - Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-44-14
Page 403/404
Dec 1/72

001B



R HYDRAULIC BRAKE FUSE - MAINTENANCE PRACTICES

R 1. General

R The hydraulic brake fuses are mounted on the brake control
R module and are accessible from the applicable left or right main
R landing gear strut well. There are two methods of resetting the
R fuse. Method one is to depressurize applicable NORM SYS B or
R ALT SYS C hydraulic reservoir. Method two is to operate the
R manual bypass valve lever on the fuse.

R 2. Equipment and Materials

R Lockwire, Fed Spec QQ-W-390, 0.020-in diameter, or equivalent

R 3. Referenced Procedure

R 29-11-00 Hydraulic Power System - Maintenance Practices

R 4. Maintenance Practices

R A. Resetting Hydraulic Fuse - Method One

- R (1) Ensure that main landing gear (MLG) wheels are chocked
R forward and aft.
- R (2) On pilots center console, zone 210, release parking
R brakes by depressing brake pedals (Ref. Fig. 201).
- R (3) Depressurize applicable NORM SYS B or ALT SYS C
R hydraulic reservoir (Ref. 29-11-00).
- R (4) In applicable left or right MLG strut well, depress
R applicable hydraulic fuse indicator (Ref. Fig. 201).
- R (5) Set parking brakes by depressing brake pedals, pulling
R out parking brake control knob, releasing brake pedals,
R and then releasing control knob.

R B. Resetting Hydraulic Fuse - Method Two

- R (1) In applicable left or right MLG strut well, cut lockwire
R of applicable manual bypass valve lever (Ref. Fig.
R 201).
- R (2) Operate manual bypass valve and depress hydraulic fuse
R indicator.

EFFECTIVITY: ALL

LOCKHEED



MAINTENANCE MANUAL

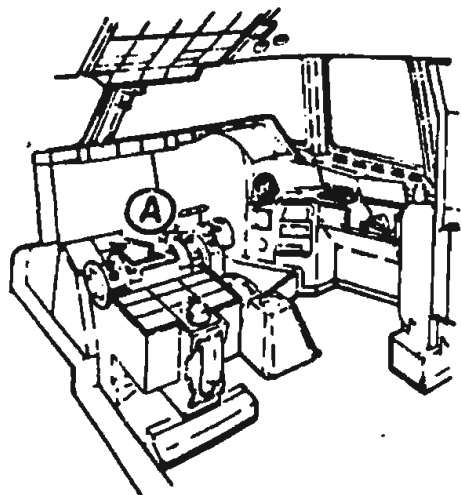
R (3) Reinstall lockwire on manual bypass valve lever.

EFFECTIVITY: ALL

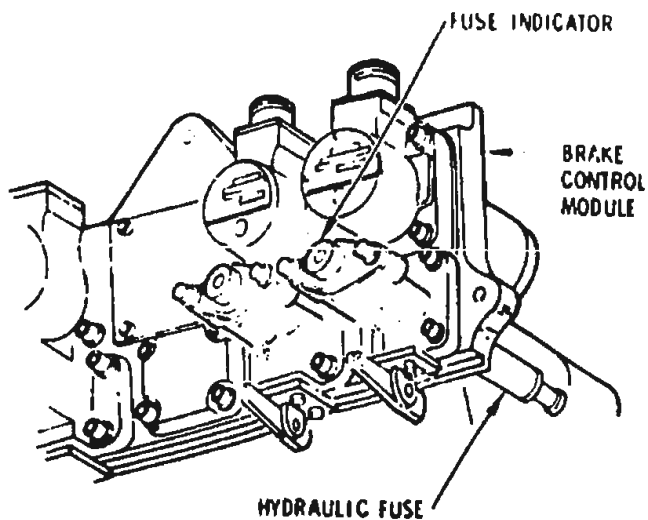
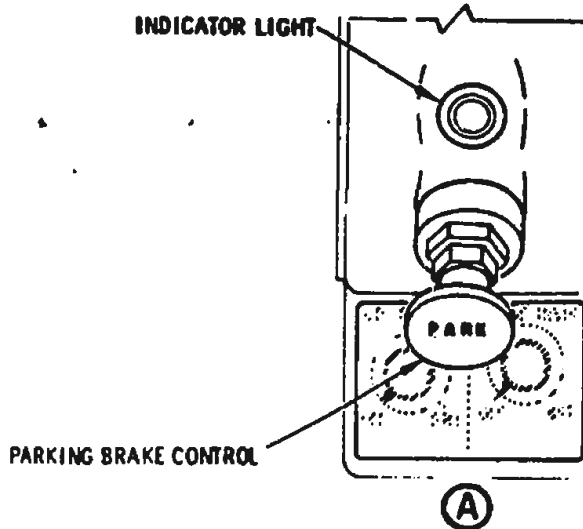
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32-44-16
Page 202
Sep 15/79

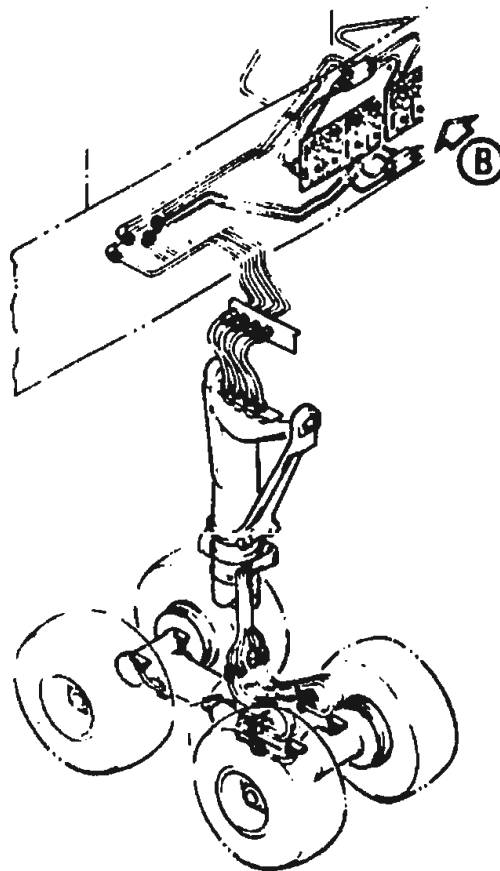
LOCKHEED
MAINTENANCE MANUAL



FLIGHT STATION
ZONE 210



(B)



MAIN LANDING GEAR
ZONE 730 AND 740

M1-0101-32-033

Hydraulic Fuse - Resetting Procedure
Figure 201

32-44-16
Page 203/204
Sep 15/79

EFFECTIVITY: ALL

R
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001B

LOCKHEED
MAINTENANCE MANUAL

R HYDRAULIC FUSE AND HYDRAULIC FUSE DIFFERENTIAL PRESSURE INDICATOR -
R REMOVAL AND INSTALLATION

1. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent
Hydraulic fluid, LAC Specification C-34-1224, Type III, or equivalent

2. Referenced Procedures

29-11-00 Hydraulic Power System - Maintenance Practices

R 32-33-00 Main Landing Gear Inboard Door - Maintenance
R Practices

32-43-00 Main Landing Gear Brake System - Maintenance
Practices

32-44-16 Hydraulic Fuse - Maintenance Practices

R 3. Removal/Installation - Fuse Assembly

A. Removal

R (1) Open applicable main landing gear (MLG) inboard door
and install inboard door actuator lock (Ref. 32-33-00).

(2) Turn off applicable hydraulic system B or C pressure
(Ref. 29-11-00).

(3) Open wing access panel 541AB or 641AB.

CAUTION: MAIN LANDING GEAR WHEELS MUST BE CHOCKED
FORWARD AND AFT BEFORE REDUCING BRAKE
PRESSURE.

(4) Pump brake pedals until applicable normal or alternate
brake system pressure is 0 psi.

(5) Remove screws and washers securing fuse to module (Ref.
Fig. 401).

R (6) Remove fuse body from fuse port of module.

(7) Cover fuse port in module to prevent contamination.

001B EFFECTIVITY: ALL

32-44-16
Page 401
Nov 15/82



B. Installation

- (1) Check packing and cap ring for condition and seating in grooves.
- (2) Lubricate packing with hydraulic fluid, uncover fuse port, and insert fuse into module.
- (3) Align fuse and attach to module with screws and washers. Tighten screws.
- (4) Lock-wire screws.

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (5) Turn on applicable hydraulic system B or C pressure (Ref. 29-11-00).
- (6) Check hydraulic fuse for leaks.
- (7) Bleed brake system (Ref. 32-43-00).
- (8) Reset fuse status indicators as required (Ref. 32-44-16).
- (9) Close wing access panel.
- (10) Close MLG inboard door (Ref. 32-10-00).
- (11) Turn off applicable hydraulic system B or C pressure (Ref. 29-11-00).

4. Removal/Installation - Fuse Differential Pressure Indicator

A. Removal

- (1) Open applicable main landing gear (MLG) inboard door and install inboard door actuator lock (Ref. 32-33-00).

EFFECTIVITY: ALL

32-44-16

Page 402
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL

- R (2) Turn off applicable hydraulic system B or C pressure
R (Ref. 29-11-00).
- R (3) Open wing access panel 541AB or 641AB.
- R CAUTION: MAIN LANDING GEAR WHEELS MUST BE CHOCKED FORWARD
R AND AFT BEFORE REDUCING BRAKE PRESSURE.
- R (4) Pump brake pedals until applicable normal or alternate
R brake system pressure is 0 psi.
- R (5) Remove screws and washers securing indicator to the
R hydraulic fuse assembly (Ref. Fig 402).
- R (6) Remove indicator from port of hydraulic fuse assembly.
- R (7) Install protective plug in indicator port of hydraulic
R fuse assembly to prevent contamination.

R B. Installation

- R (1) Check packings and retainers for condition to ensure
R that they are correctly seated in packing grooves.
- R (2) Lubricate packings with hydraulic fluid, remove
R protective plug and insert indicator into hydraulic
R fuse assembly.
- R (3) Align indicator and secure to fuse assembly with screws
R and washers. Torque screws to 120 ±10 lbs/in.
- R (4) Lockwire screws.

R WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY
R HYDRAULIC SYSTEM:

R LANDING GEAR DOWN LOCK SAFETY PINS AND DOOR SAFETY
R DEVICES ARE INSTALLED.

R PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL
R FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL
R AREAS.

R THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT
R HYDRAULIC PRESSURE.

- R (5) Turn on applicable hydraulic system B or C pressure
R (Ref. 29-11-00).
- R (6) Check differential pressure indicator for leaks.
- R (7) Bleed brake system (Ref. 32-43-00).

R EFFECTIVITY: ALL
R

001B

32-44-16
Page 403
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL

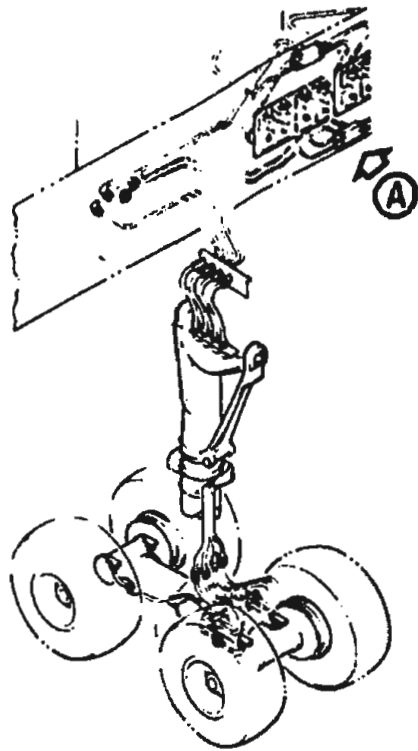
- R (8) Reset fuse status indicators as required (Ref.
R 32-44-16).
- R (9) Close wing access panel.
- R (10) Close MLG inboard door (Ref. 32-33-00).
- R (11) Turn off applicable hydraulic B or C pressure (Ref.
R 29-11-00).

R EFFECTIVITY: ALL
R

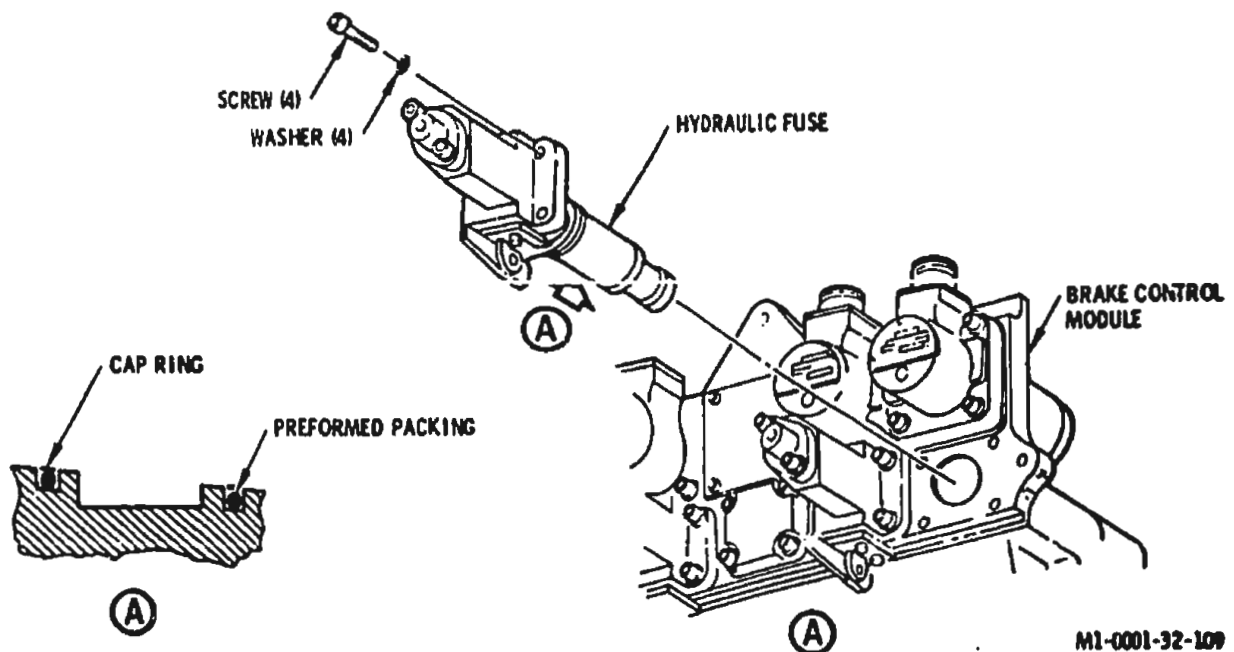
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32-44-16
Page 404
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL



MAIN LANDING GEAR
ZONE 730 AND 740



M1-0001-32-109

Hydraulic Fuse - Removal and Installation
Figure 401

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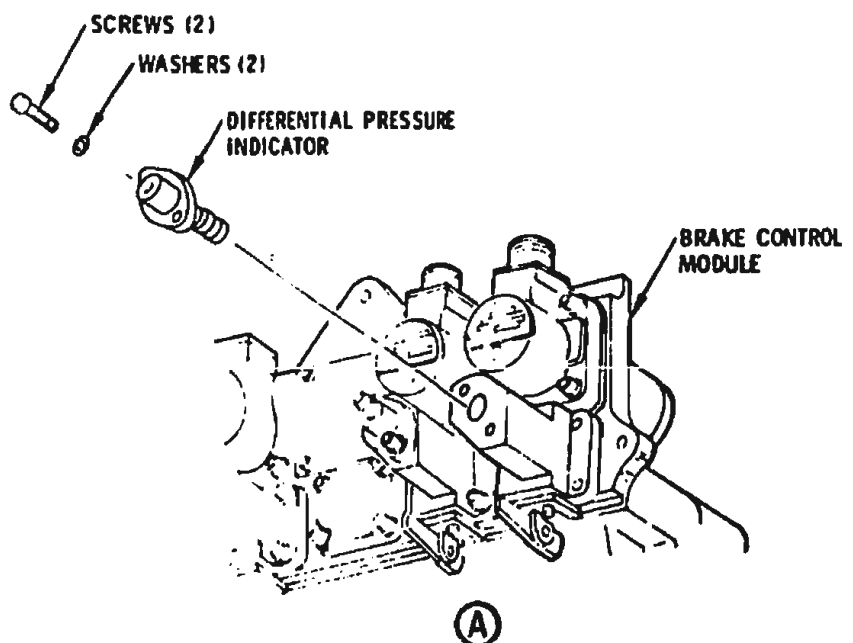
EFFECTIVITY: ALL

32-44-16
Page 405
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL



MAIN LANDING GEAR
ZONE 730 AND 740



M1-0000-32-774

Hydraulic Fuse - Differential Pressure Indicators
Removal and Installation
Figure 402

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EFFECTIVITY: ALL

001B

32-44-16
Page 406
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL

R BRAKE SYSTEM SELECTOR SWITCH - REMOVAL AND INSTALLATION

R 1. Referenced Procedure

R 24-00-00 Electrical Power - Maintenance Practices

R 2. Removal/Installation

R A. Removal

R (1) On Flight Engineer/Second Officers overhead circuit
R breaker panel CB2, zone 215, open and tag PARKING BRAKE
R NO. 1 (G18) and PARKING BRAKE NO. 2 (G22) circuit
R breakers.

R (2) Slide out pilots center instrument panel as follows:

R (a) Release quick-disconnect fasteners (Ref. Fig.
R 401).

R (b) Depress secondary latch pushbutton and pull panel
R from support frame until slide assembly stops
R engage.

R (3) Remove nut, lock washer, and keyway washer from front
R of switch.

R (4) Note orientation and remove switch.

R (5) Tag and remove wires from back of switch.

R B. Installation

R (1) Verify that circuit breakers opened in Step A(1) are
R open and tagged.

R (2) Connect wires to back of switch.

R (3) Insert switch into panel and orient as noted in Step
R A(4).

R (4) Secure switch using keyway washer, lock washer, and
R nut.

R (5) Turn on electrical power (24-00-00).

R (6) Verify that LANDING GEAR control lever is in DOWN
R position.

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EFFECTIVITY: ALL

32-44-17
Page 401
May 15/76

LOCKHEED



MAINTENANCE MANUAL

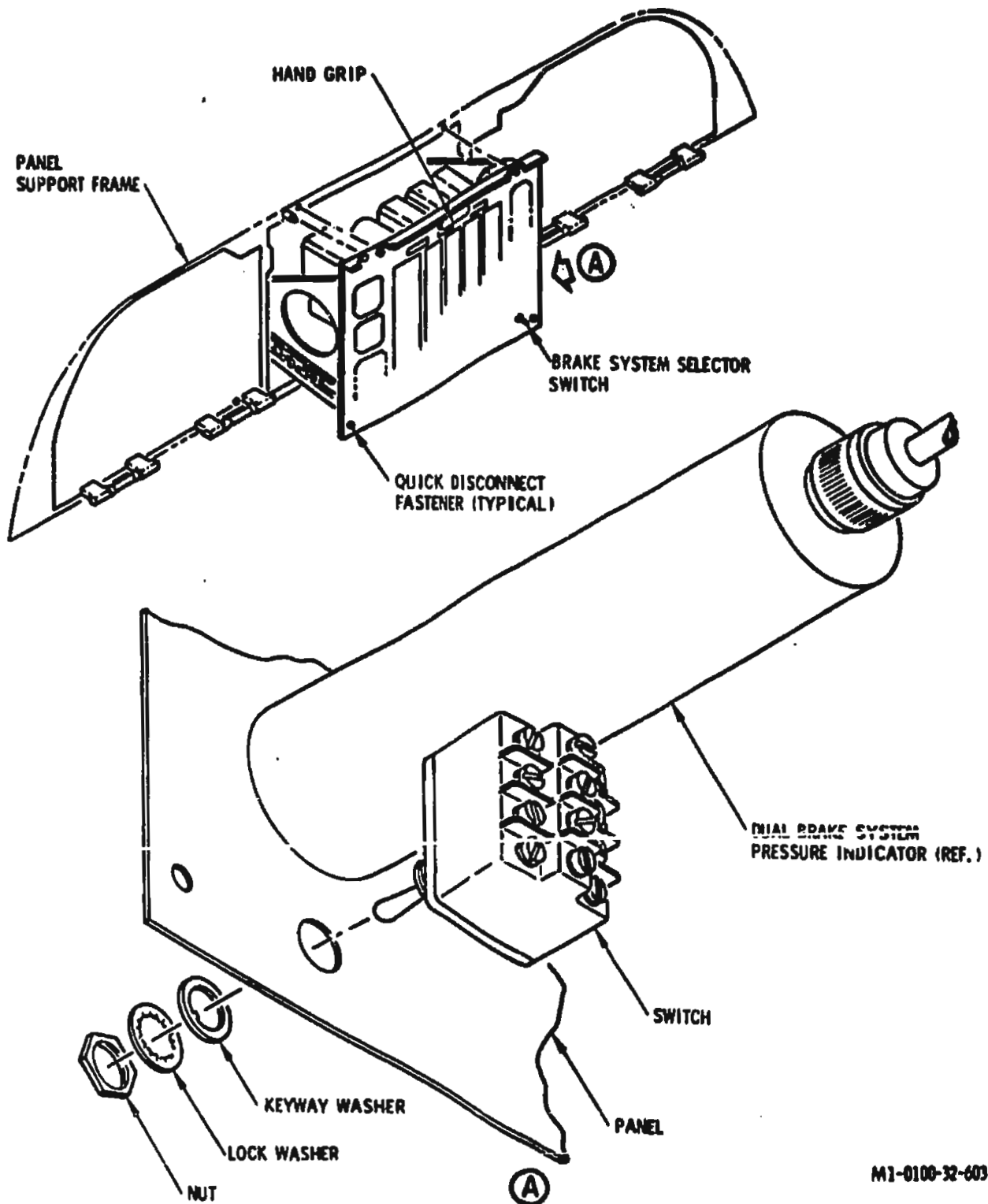
- R (7) Remove tags and close circuit breakers opened in Step
- R A(1).
- R (8) Position BRAKE SYS SELECT switch to ALT position.
- R (9) At back of switch verify 28V dc at 3200-P2 pins 5, 2,
- R 8, and 11.
- R (10) Turn off electrical power (24-00-00).
- R (11) Return panel to operational position.
- R (12) Secure panel with quick-disconnect fasteners.

R EFFECTIVITY: ALL

001B

32-44-17
Page 402
May 15/76

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-603

Brake System Selector Switch - Removal and Installation
Figure 401

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EFFECTIVITY: ALL

32-44-17
Page 403/404
May 15/76

BRAKE TEMPERATURE INDICATION SYSTEM - DESCRIPTION AND OPERATION

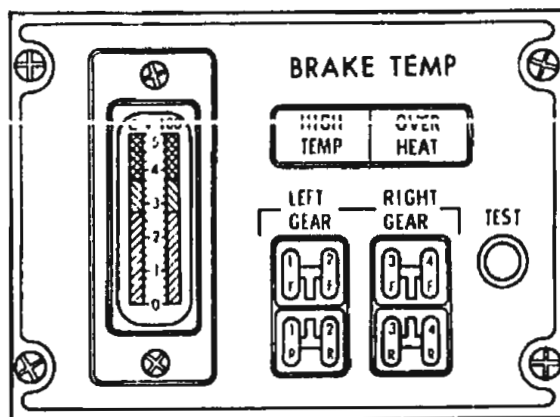
1. General

The brake temperature indicating system (Ref. Fig 1) provides the Captain and the Flight Engineer/Second Officer brake temperature information. The Flight Engineer/Second Officers BRAKE TEMP panel, zone 215, displays brake temperature selectable by wheel pair. An amber indicator light (HIGH TEMP) comes on when any one brake reaches a temperature of 275 degrees C. A red indicator light (OVERHEAT) comes on when any one brake reaches a temperature of 400 degrees C. When the OVERHEAT indicator light comes on, the BRAKE TEMP indicator light on the pilots annunciator panel, zone 211, comes on.

Two thermocouple compensators are located in the junction boxes on each main landing gear strut. Each brake assembly is provided with a sensor (thermocouple).

2. Operation

During normal operation (Ref. Fig. 2), the eight brake sensor output voltages are multiplexed in the monitor panel. When any



FLIGHT ENGINEER PANEL



PILOTS ANNUNCIATOR PANEL

Brake Temperature Indicators
Figure 1

EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL

brake sensor threshold temperature reaches 275 degrees C, the Flight Engineer/Second Officers HIGH TEMP indicator light comes on. When a sensor threshold temperature reaches 400 degrees C, the Flight Engineer/Second Officers OVERHEAT indicator light and the Captains BRAKE TEMP indicator light comes on. In order to determine which brake temperatures have reached either threshold, the brake selector pushbutton switches 1F/2F, 1R/2R, 3F/4F, and 3R/4R on the BRAKE TEMP panel must be depressed. When a pushbutton pair is depressed, the pushbutton light comes on, the meter lights come on, and the dual meter on the BRAKE TEMP panel indicates the individual brake temperatures for that pair. The momentary-type pushbutton TEST switch on the BRAKE TEMP panel, in combination with the brake selector pushbutton switches, are used to test the operational status of the system and to isolate a malfunction to the component level.

3. Brake Temperature System Monitor

A. Description

The brake temperature system BRAKE TEMP monitor panel (Ref. Fig. 1) receives temperature-induced variations in generated current from the brake thermocouples, and provides direct-reading indications of the system status to the Captain and the Flight Engineer/Second Officer. The panel includes a direct-reading dual meter, a HIGH TEMP caution indicator light, an OVERHEAT warning indicator light, four pair of brake selector pushbutton switches, and a pushbutton TEST switch. The meter and panel lighting are energized by 5V ac power; the brake selector pushbutton switches and indicator lights are energized by 28V dc power. The pushbutton TEST switch is not illuminated. The pushbutton TEST switch, in combination with the brake selector pushbutton switches, are used to test the operational status of the system and to isolate a malfunction to the component level. All internal circuits end in a 24-pin receptacle on the back of the monitor.

4. Brake Temperature Compensator

A. Description

The factory-calibrated brake temperature compensator is installed between the thermocouple and the brake temperature system monitor. The compensator provides the minor circuit adjustment required by the different lengths of the circuit wires (Ref. Fig. 2). The two compensators have pigtails for series connection into the temperature indicating circuit. There is a compensator for the right main landing gear MLG brakes and one for the left MLG brakes.

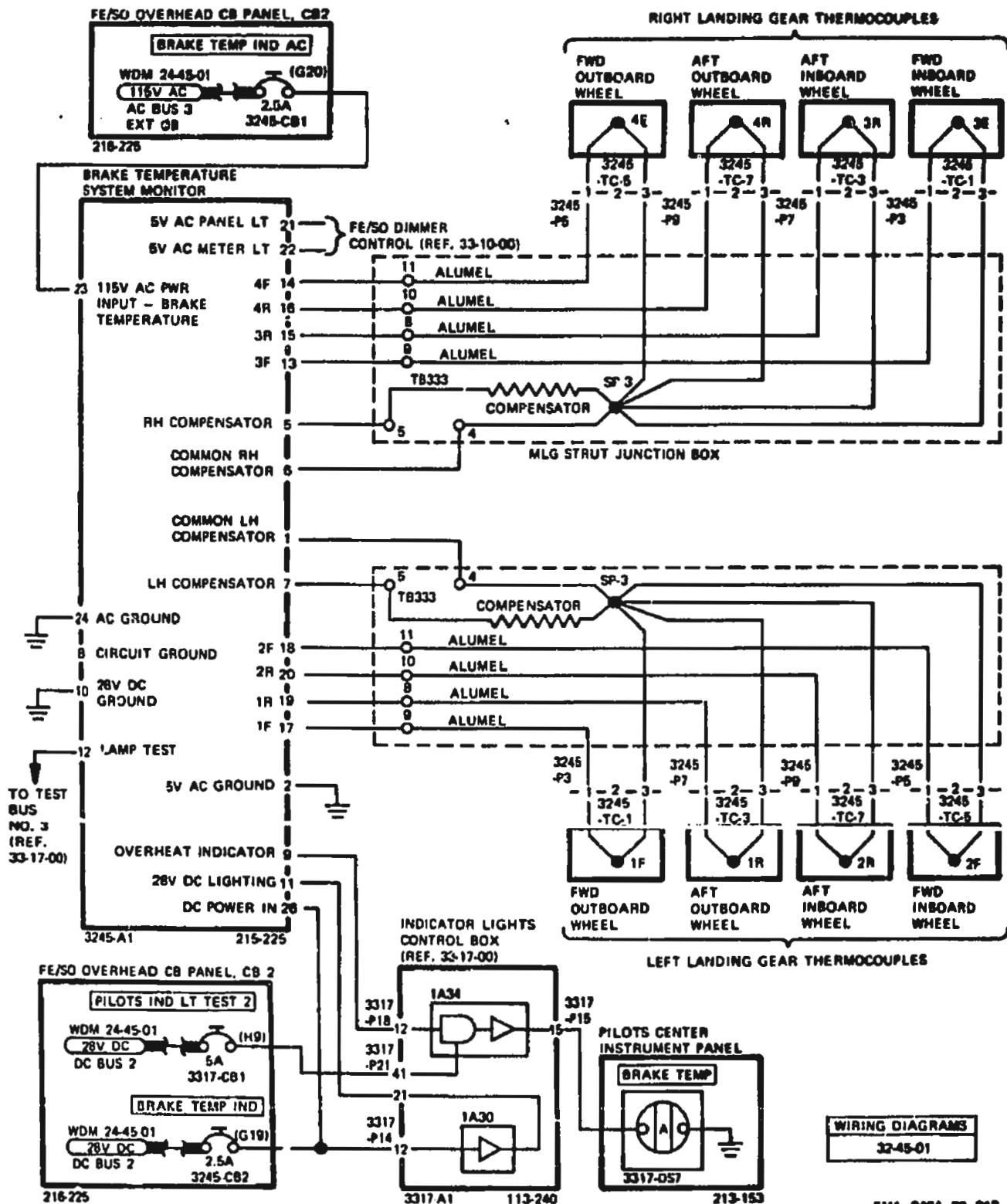
EFFECTIVITY: ALL

32-45-00

Page 2
Dec 1/71

LOCKHEED

MAINTENANCE MANUAL



Brake Temperature Indicating System
Electrical Schematic Diagram
Figure 2

EFFECTIVITY: ALL

32-45-00
Page 3
Feb 15/77

004B

LOCKHEED
MAINTENANCE MANUAL

5. Brake Temperature Thermocouple

A. Description

The eight brake temperature thermocouples sense the brake temperature by the thermal action at the Chromel-Alumel junction. The rise in temperature generates a voltage in each thermocouple approximately in direct ratio to the temperature rise in hundreds of degrees C. The voltage from the eight thermocouples is multiplexed in the brake temperature system monitor to provide continuous monitoring of the brake temperatures (Ref. Fig. 2).

EFFECTIVITY: ALL

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32-45-00
Page 4
Dec 1/71

R BRAKE_TEMPERATURE_INDICATING_SYSTEM - FAULT_ISOLATION

Reference data and fault isolation procedures for troubleshooting landing gear system faults are included in this section of the manual. A landing gear system malfunction detected by the flight crew is normally entered in the aircraft flight log book and reported to maintenance personnel by a FIRM fault code number. This number and the flight log book write-up can be found in the Chapter 32 Fault Code Index. The index specifies the maintenance manual section, fault isolation diagram figure number and, where appropriate, a block number indicating the diagram entry point containing the fault isolation procedure. When no block number is specified, the diagram entry point is Block 1.

R Prerequisites listed at the top of each diagram identify
R mandatory preliminary steps and circuit breakers that must be
R closed before initiating any fault isolation step.

Schematic diagrams, identified by a SCHEM number, supplement fault isolation procedures as maintenance aids. The schematics show the basic system circuitry necessary for troubleshooting and include cross-reference indexes to the wiring diagram manual pages required for checking component interconnect wiring.

R Table 101 is a list of fault isolation data in this section of
R the manual.

Brake Temperature Indicating System Fault Isolation

Table 101

FIGURE	TITLE
101	Component Location Index
102	Components Locator Diagram
103	Brake Temperature Indicating System Check
SCHEM 1	Brake Temperature Indicating System Electrical Schematic

0018

32-45-00
Page 101
Mar 15/81

LOCKHEED
MAINTENANCE MANUAL

COMPONENT	QTY	AREA/ACCESS	REFERENCE
COMPENSATOR, BRAKE TEMPERATURE	2	MLG STRUT JUNCTION BOX	32-45-02
ILCB CARD 1A30	1	FESC/112AB, 211CB	33-17-04
MONITOR, BRAKE TEMPERATURE	1	FLT STA/P11, P12	32-45-01
THERMOCOUPLE, BRAKE TEMPERATURE	8	MLG, AT EACH BRAKE ASSY	32-45-03

M1-0000-32-077

Component Location Index
Figure 101

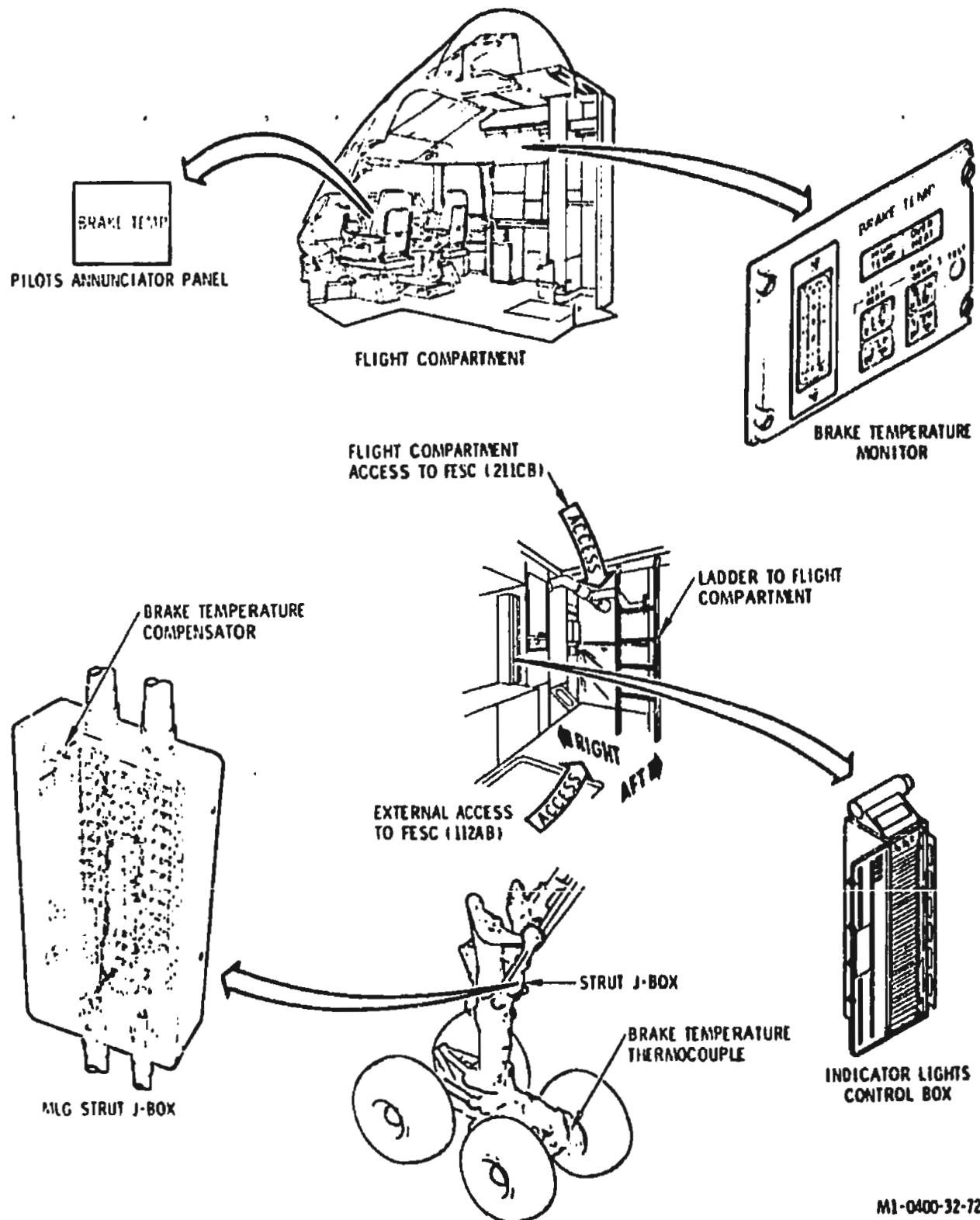
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001B

32-45-00
Page 102
Mar 15/81

LOCKHEED
MAINTENANCE MANUAL



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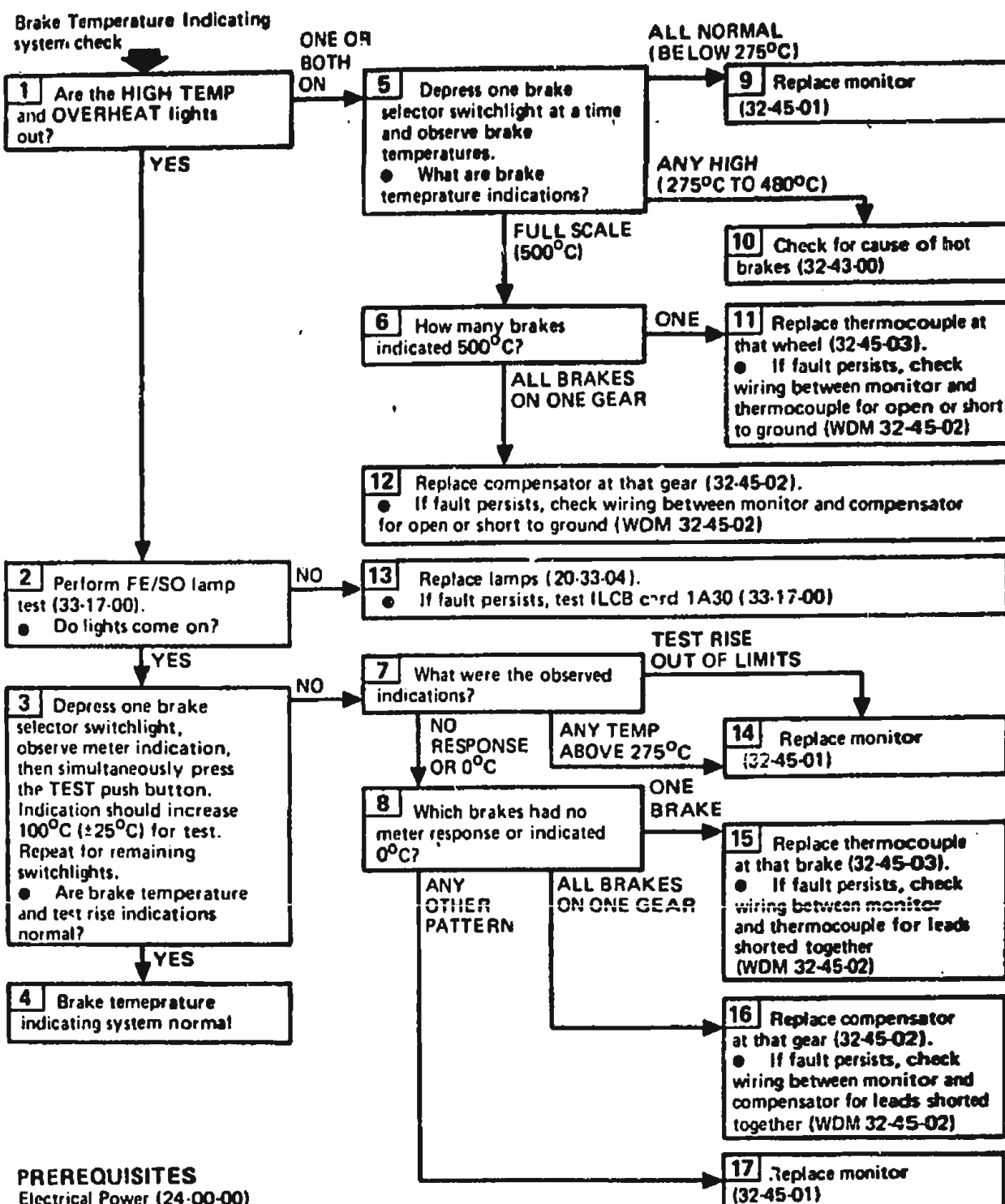
Brake Temperature Indicating System Component Locator
Figure 102

EFFECTIVITY: ALL

001B

32-45-00
Page 103
Mar 15/81

LOCKHEED
MAINTENANCE MANUAL



M1-0402-32-539

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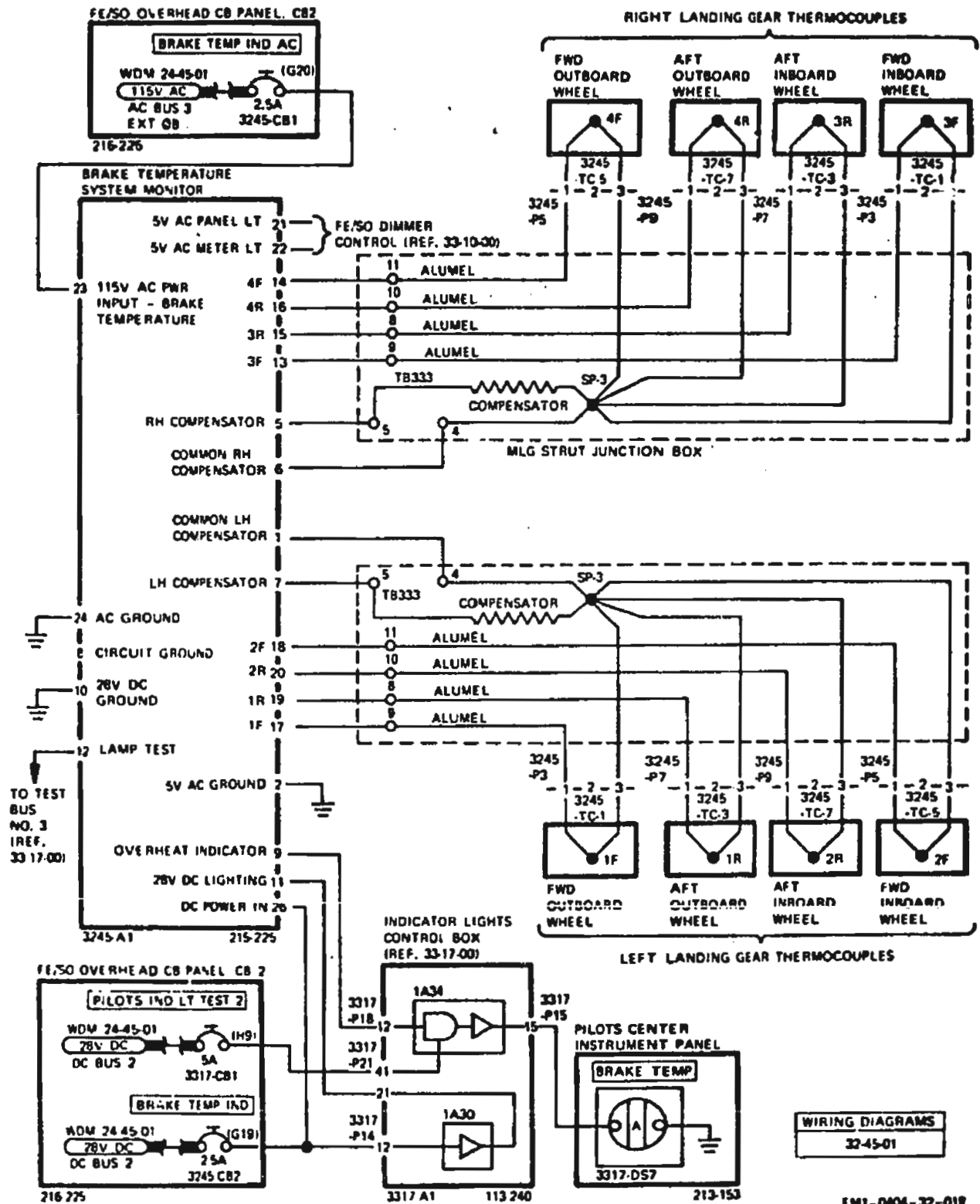
Brake Temperature Indicating System Check
Figure 103

EFFECTIVITY: ALL

001B

32-45-00
Page 104
Mar 15/81

LOCKHEED
MAINTENANCE MANUAL



Brake Temperature Indicating System Electrical Schematic
SCHEM 1

EFFECTIVITY: ALL

32-45-00
Page 105/106
Mar 15/81



C BRAKE TEMPERATURE INDICATING SYSTEM MAINTENANCE NOTES, DATA,
C TOLERANCES AND REGULATIONS

C 1. Takeoff Minimum Ground Time

- C A. TWA Flight Operation requirements indicate that whenever the
CR brake temperatures go into the red area, a minimum 50-minute
C ground time must be observed unless Maintenance ascertains a
C shorter period.
- C B. Any time the flight crew squawk or write-up indicates having
CR performed a landing, abort or rejected take off with high
C energy braking and the brake temperature indicator registers
CR in the red band, then a takeoff must not be scheduled within
CR 50 minutes. However, if the brake temperature indicator has
CR returned to the amber band, 400°C reading or less, the
CR brakes have the ability to perform an abort; and the takeoff
C can be scheduled. If the required 50-minute waiting period
C has been honored and the temperature indicator still
C registers above 400°C, the temperature indicating system
CR should be written up to obtain a thorough check-out at the
first opportunity, and the flight then dispatched.

BRAKE TEMPERATURE INDICATION SYSTEM - ADJUSTMENT AND TEST

1. General

This procedure contains instructions for testing the brake temperature indication system using the built-in test equipment (BITE) circuits. Tests are performed using the manual command mode and the system TEST switches.

2. Referenced Procedure

24-00-00 Electrical Power - Maintenance Practices

3. Adjustment/Test

A. BITE Test

- (1) Ensure that both ac and dc electrical power is turned on (Ref. 24-00-00).
- (2) On Flight Engineer/Second Officers upper panel, zone 215, depress brake temperature indication monitor 1F 2F switch. Observe that switch and temperature indicator lights come on. Observe indicator temperature reading (Ref. Fig. 501).
- (3) Depress TEST switch and observe rising temperature indication.

NOTE: Depressing the TEST switch results in an indicated temperature increase of 100 (± 25) degrees centigrade. An indicated increase of less than 100 (± 25) degrees will occur when the ambient temperature of the compensator and thermocouple is below 0 degrees centigrade. The increase will be reduced by the same amount that the ambient temperature is below 0 degrees.

When the brake temperature indication is in the green band, and is within 80 degrees of the lower edge of the yellow band, depressing the TEST switch activates the HIGH TEMP warning light. If the brake temperature indication is in the yellow band, and is within 80 degrees of the lower edge of the red band, the HIGH TEMP warning light will be on and depressing the TEST switch activates the OVERHEAT warning light and the pilots BRAKE TEMP light.

EFFECTIVITY: ALL

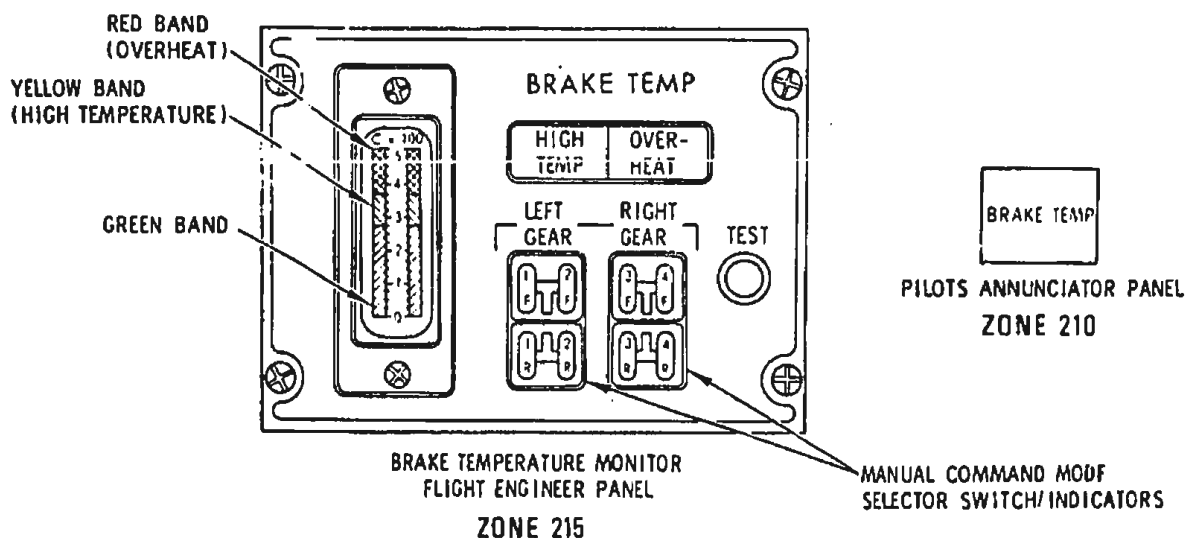
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32-45-00
Page 501
May 15/73

LOCKHEED
MAINTENANCE MANUAL

The OVERHEAT warning light trigger level is in tolerance, if the light comes on when the pointer on the temperature indicator is within one minor division of the line between the red and yellow bands. The HIGH TEMP warning light trigger level is in tolerance, if the light comes on when the pointer is within one minor division of the line between the yellow and green bands.

- (4) Repeat Steps 3A(2) and 3A(3) for 1R 2R, 3F 4F, and 3R 4R switches.
- (5) Turn off electrical power as required (Ref. 24-00-00).



Brake Temperature Monitor and Pilots Indicator Light
Figure 501

EFFECTIVITY: ALL

32-45-00
Page 502
May 15/73

HA 2705
M1-0100-32-320

LOCKHEED
MAINTENANCE MANUAL

R BRAKE TEMPERATURE MONITOR - REMOVAL AND INSTALLATION

R 1. Referenced Procedure

R 32-45-00 Brake Temperature Indicating System - Adjustment
R and Test

R 2. Removal/Installation

R A. Removal

R (1) On Flight Engineer/Second Officers overhead circuit
R breaker panel CB2, zone 215, open and tag BRAKE - TEMP
R IND - DC (G19) and AC (G20) circuit breakers.

R (2) On Flight Engineer/Second Officers overhead console,
R release fasteners on face of brake temperature monitor
R (Ref. Fig. 401).

R (3) Slide monitor out of panel.

R (4) Disconnect electrical connector from rear of monitor.

R B. Installation

R (1) Verify that circuit breakers called out in Step A(1)
R are open and tagged.

R (2) Connect electrical connector to rear of monitor.

R (3) Install monitor into console.

R (4) Secure fasteners on face of monitor.

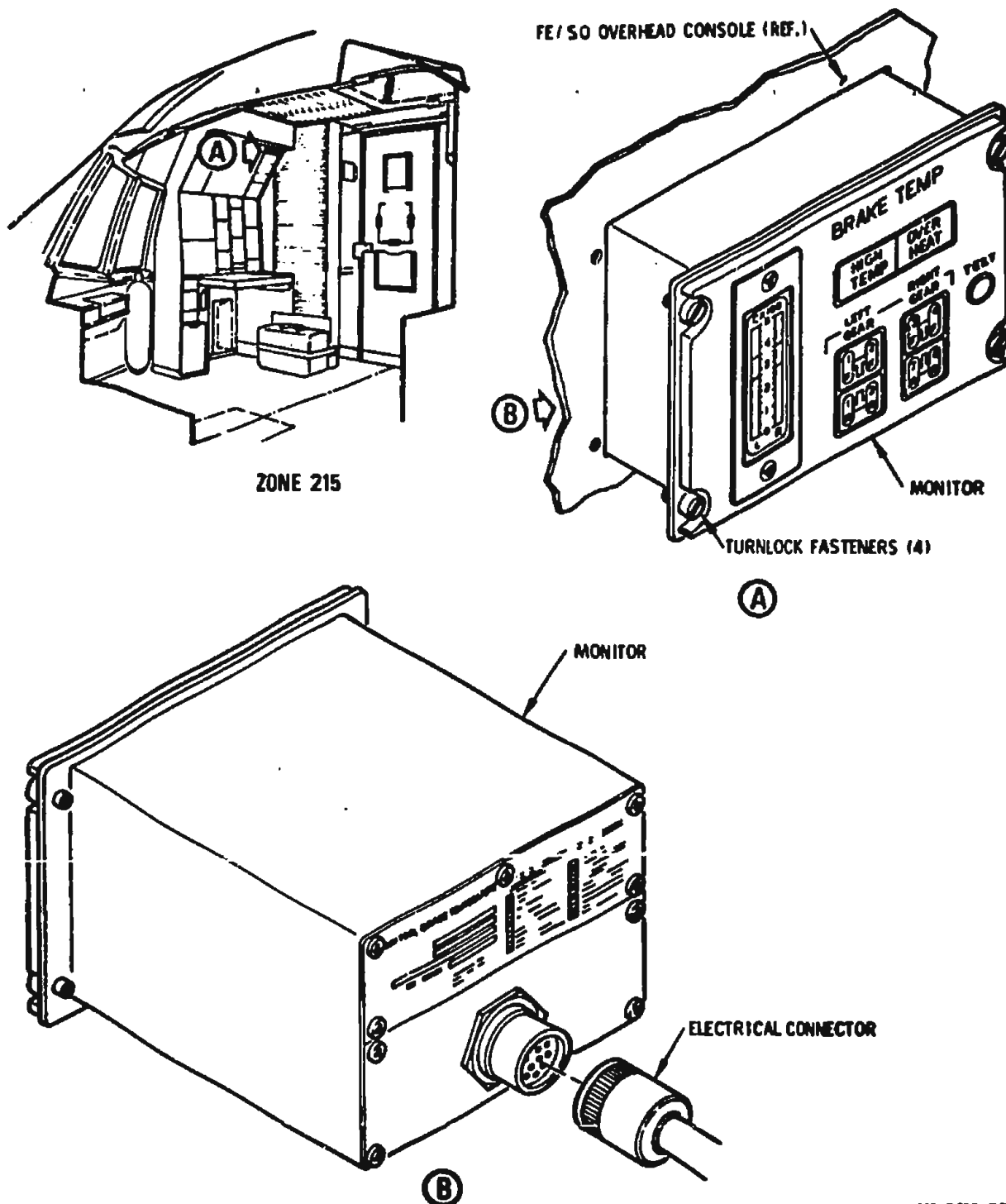
R (5) Remove tags and close circuit breakers opened in Step
R A(1).

R (6) Perform brake temperature indicating system test (Ref.
R 32-45-00).

R EFFECTIVITY: ALL
R
004B

32-45-01
Page 401
Feb 15/76

LOCKHEED
MAINTENANCE MANUAL



M1-0400-32-990

Brake Temperature Monitor - Removal and Installation
Figure 401

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EFFECTIVITY: ALL

32-45-01
Page 402
Feb 15/76

LOCKHEED
MAINTENANCE MANUAL

R BRAKE TEMPERATURE COMPENSATOR - REMOVAL AND INSTALLATION

R 1. Referenced Procedures

- R 32-45-00 Brake Temperature Indicating System - Adjustment
R and Test
- R WDM 20-11-10 Splicing of Electrical Wire, Coaxial Cable, and
R Multiple Conductor Shielded Cable
- R WDM 20-11-26 Electrical and Electronic Lacing and Tying of Wire
R Bundles for the L-1011 Aircraft

R 2. Removal/Installation

R A. Removal

- R (1) On Flight Engineer/Second Officers overhead circuit
R breaker panel CB2, Zone 215, open and tag BRAKE - TEMP
R IND - DC (G19) and AC (G-20) circuit breakers.
- R (2) On applicable main landing gear (MLG) strut aft side,
R remove cover from strut junction box J1 (Ref. Fig.
R 401).
- R (3) Loosen clamp securing compensator to side of box.
- R (4) Disconnect wire 3245-15E20 from TB333 terminal post No.
R 5.
- R (5) Cut wire 3245-16F20 approximately three inches from
R compensator.
- R (6) Remove compensator.

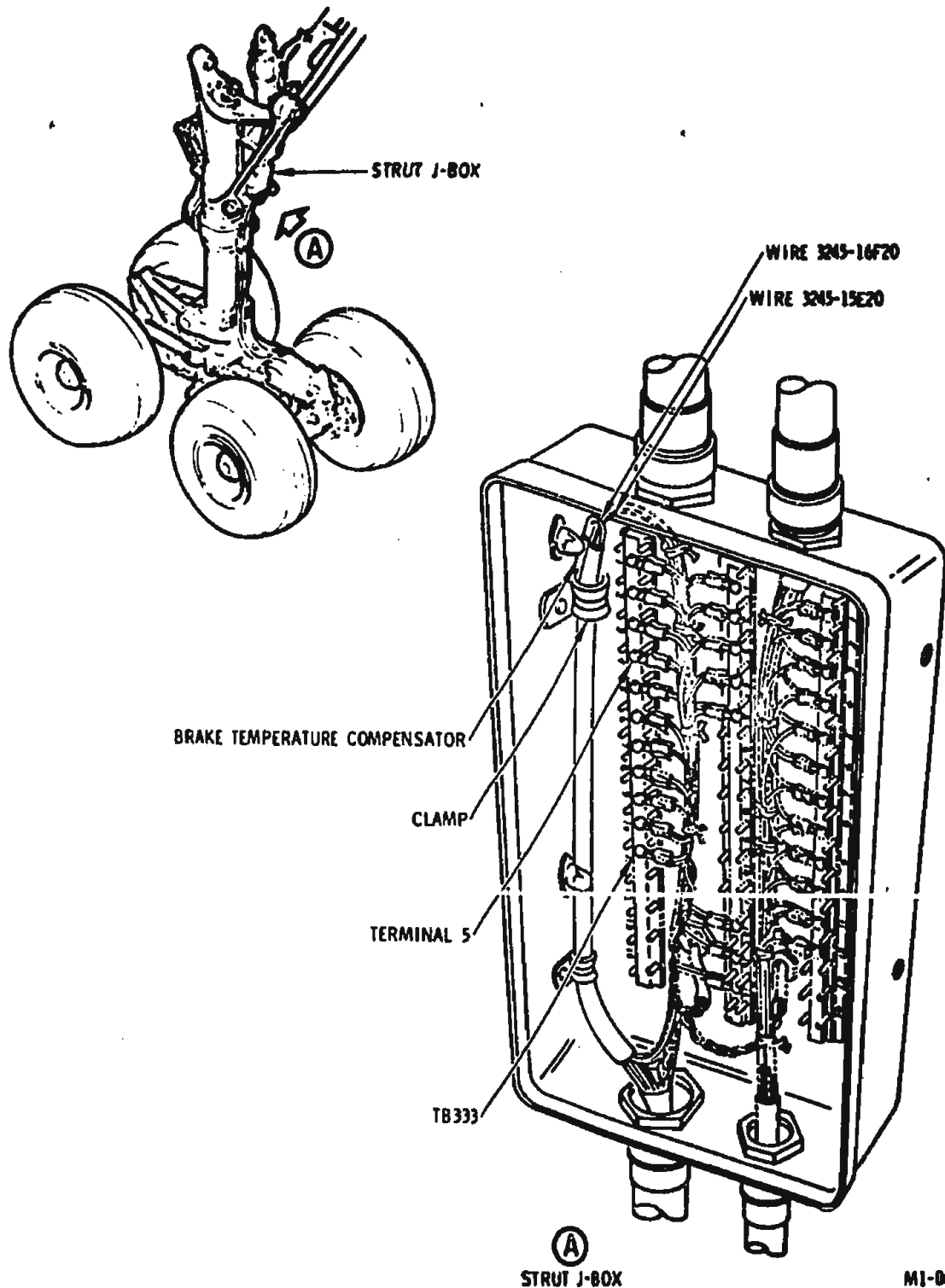
R B. Installation

- R (1) Encase compensator in shrink tube.
- R (2) Insert compensator into clamp and secure in place.
- R (3) Route compensator wire 3245-15E20 and connect to TB333
R terminal post No. 5. Secure as required (WDM
R 20-11-26).
- R (4) Splice compensator wire 3245-16F20 to aircraft wire of
R same number (Ref. WDM 20-11-10).

R EFFECTIVITY: ALL
R
0048

32-45-02
Page 401
Feb 15/76

LOCKHEED
MAINTENANCE MANUAL



M1-0400-32-591

Brake Temperature Compensator - Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-45-02
Page 402
Feb 15/76

R
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004B

LOCKHEED
MAINTENANCE MANUAL

- R (5) Remove tags and close circuit breakers opened in Step
R A(1).
- R (6) Perform brake temperature indicating system test (Ref.
R 32-45-00).
- R (7) Install J1 box cover.

R
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EFFECTIVITY: ALL

32-45-02
Page 403/404
Feb 15/76

LOCKHEED
MAINTENANCE MANUAL

BRAKE TEMPERATURE THERMOCOUPLE - REMOVAL AND INSTALLATION

1. Referenced Procedures

- 32-41-00 Main Landing Gear Wheel and Tire Assembly - Removal and Installation
- R 32-45-00 Brake Temperature Indication System - Adjustment
R and Test

2. Removal/Installation

A. Removal

- (1) Remove main landing gear (MLG) wheel and tire assembly (Ref. 32-41-00).
- (2) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag BRAKE TEMP IND AC and DC circuit breakers.
- (3) Disconnect plug from thermocouple receptacle and cap receptacle.
- (4) Remove NAS501-3H3A bolt and flat washer at torque plate (Ref. Fig. 401).
- (5) At piston housing, top center position, remove screws holding thermocouple connector in place.
- R (6) Straighten thermocouple lead at torque plate side and
R attach a pull-wire through hole of thermocouple.
- R (7) Pull thermocouple and lead through piston housing
R leaving pull-wire in brake assembly for installation.

B. Installation

- (1) Verify that circuit breakers opened in Step 2A(2) are opened and tagged.
- R (2) Attach pull-wire through hole of thermocouple.
- R (3) Insert brake temperature thermocouple assembly into
R piston housing receptacle and pull through housing.
- R (4) Bend lead until hole in thermocouple is aligned with
R bolt hole and secure in place with bolt and flat
R washer.

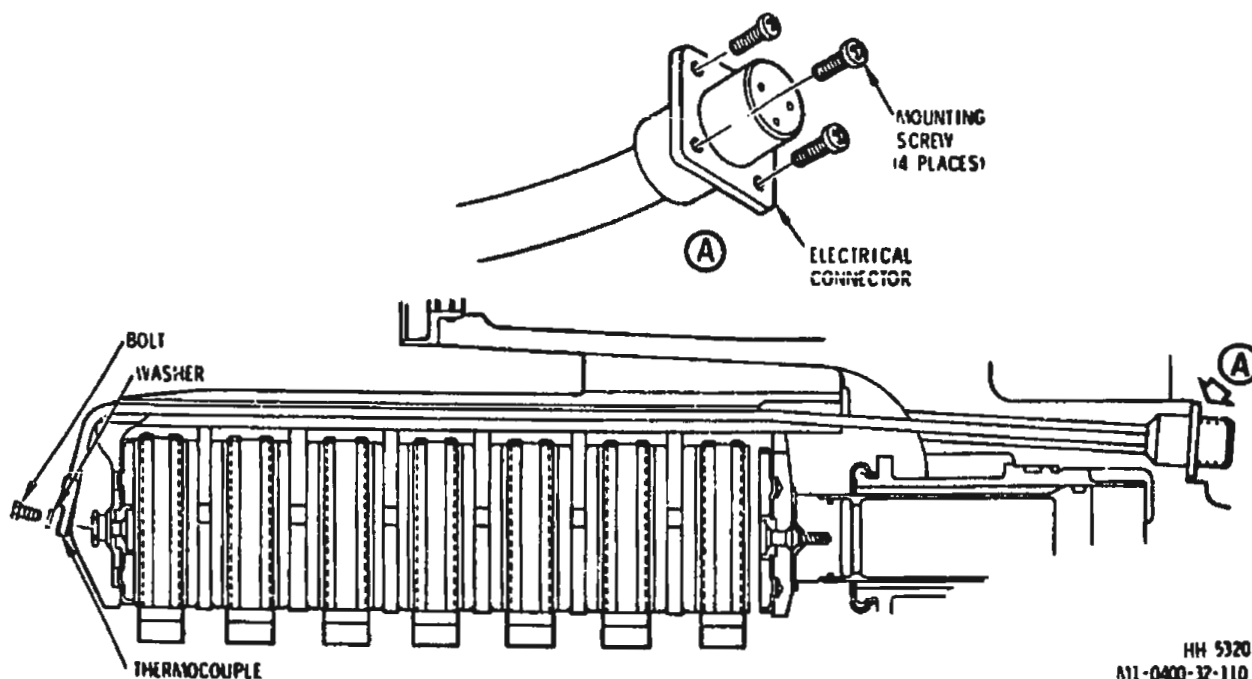
EFFECTIVITY: ALL

32-45-03
Page 401
May 15/74

LOCKHEED
MAINTENANCE MANUAL

- (5) Install screws that secure thermocouple connector in place.
- (6) Remove cap from receptacle and connect plug to thermocouple receptacle.
- (7) Remove tags and close circuit breakers opened in Step 2A(2).
- (8) Reinstall MLG wheel and tire assembly (Ref. 32-41-00).
- (9) Perform brake temperature indication system test (Ref. 32-45-00).

R
R



HH 5320
A11-0400-32-110

Brake Temperature Thermocouple - Removal and Installation
Figure 401

EFFECTIVITY: ALL

004B

32-45-03
Page 402
May 15/74

**BRAKE_TEMPERATURE_THERMOCOUPLE_-_INSPECTION_AND_CHECK****1. Equipment and Materials**

Volt ohmmeter, Simpson 260, or equivalent meter with an accuracy within three percent

2. Referenced Procedure

32-45-00 Brake Temperature Indicating System - Adjustment and Test

3. Inspection/Check**A. Check**

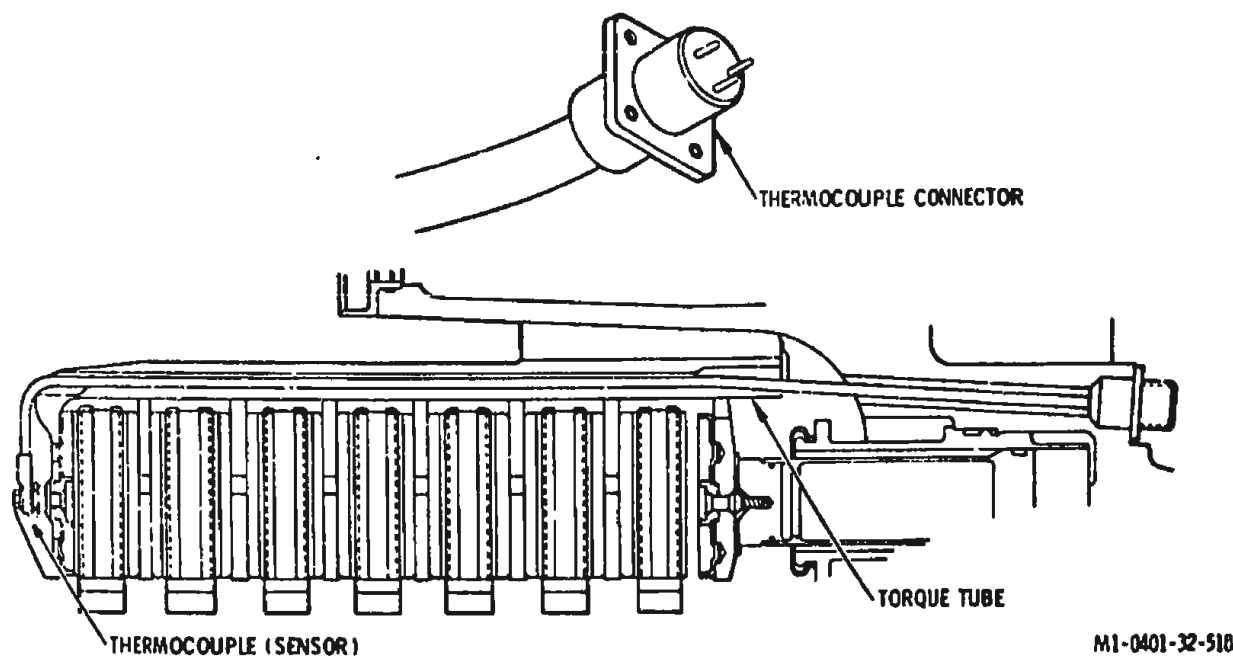
- (1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breakers BRAKE TEMP IND AC and DC (G19 and 20).
- R (2) Disconnect plug from thermocouple connector.
- R (3) Check for loose thermocouple connector pins by applying
R light pressure to end of pins. Pins should not
 depress.
- (4) Using ohmmeter, measure resistance between pins 1 and
 3. Resistance measured must be between 5 and 8 ohms.
- R (5) Measure resistance between either pin 1 or 3 and brake
R torque tube (Ref. Fig. 601). Resistance must exceed 1
 million ohms (1 megohm).
- R (6) Connect plug to thermocouple connector.
- (7) Remove tag and close circuit breaker opened in Step
 (1).
- (8) Perform brake temperature indicating system test (Ref.
 32-45-00).

EFFECTIVITY: ALL

0048

32-45-03
Page 601
Aug 15/75

LOCKHEED
MAINTENANCE MANUAL



Brake Temperature Thermocouple (Sensor) Check
Figure 601

32-45-03
Page 602
Aug 15/75

R EFFECTIVITY: ALL
R
004B

LOCKHEED
MAINTENANCE MANUAL

BRAKE TEMPERATURE MONITOR PRINTED WIRING BOARD
REMOVAL AND INSTALLATION

1. Referenced Procedure

32-45-00 Brake Temperature Indicating System - Adjustment and Test

2. Removal/Installation

A. Removal

- (1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breakers BRAKE - TEMP IND - DC and AC.
- (2) On the Flight Engineer/Second Officers overhead console release fasteners in the face of the brake temperature monitor, and slide monitor out of console.
- (3) Disconnect the electrical connector from the monitor.
- (4) Remove the identification plate from the back of monitor housing.
- (5) Pull out printed circuit board assembly from printed circuit connector.

B. Installation

- (1) Inspect the printed circuit board and make certain it is properly polarized to insert into the printed circuit board connector.

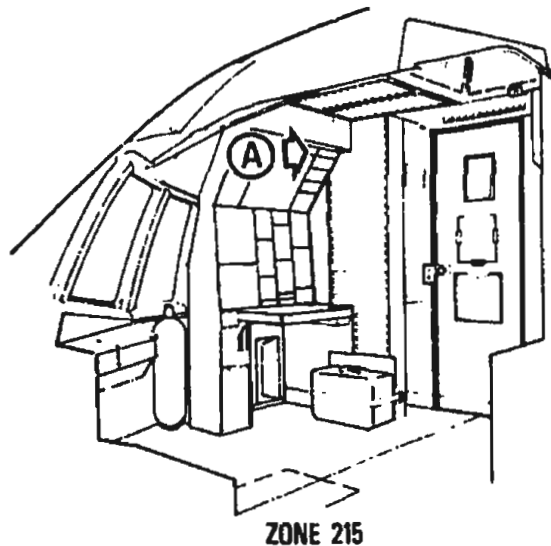
NOTE: Printed circuit board is not symmetrical. When viewed from the top with contacts pointing toward the printed circuit connector, the largest corner cutout must be on the right (Ref. Fig. 401).

- (2) Install printed circuit board into monitor housing and printed circuit board connector.
- (3) Attach identification plate housing. Torque bolts 4.5 to 5 lb in.
- (4) Connect the electrical connector to the monitor.

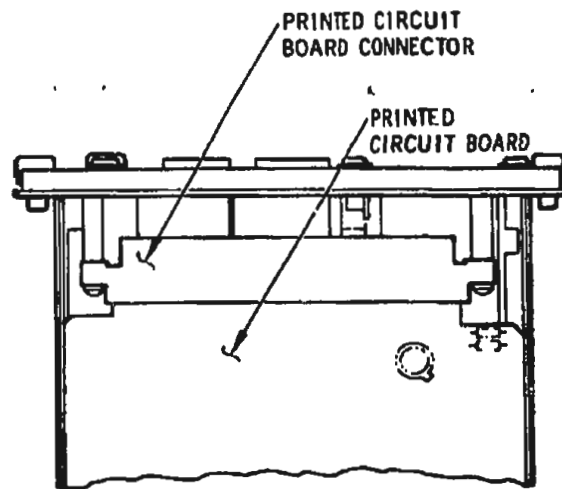
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32-45-04
Page 401
Apr 1/72

LOCKHEED
MAINTENANCE MANUAL

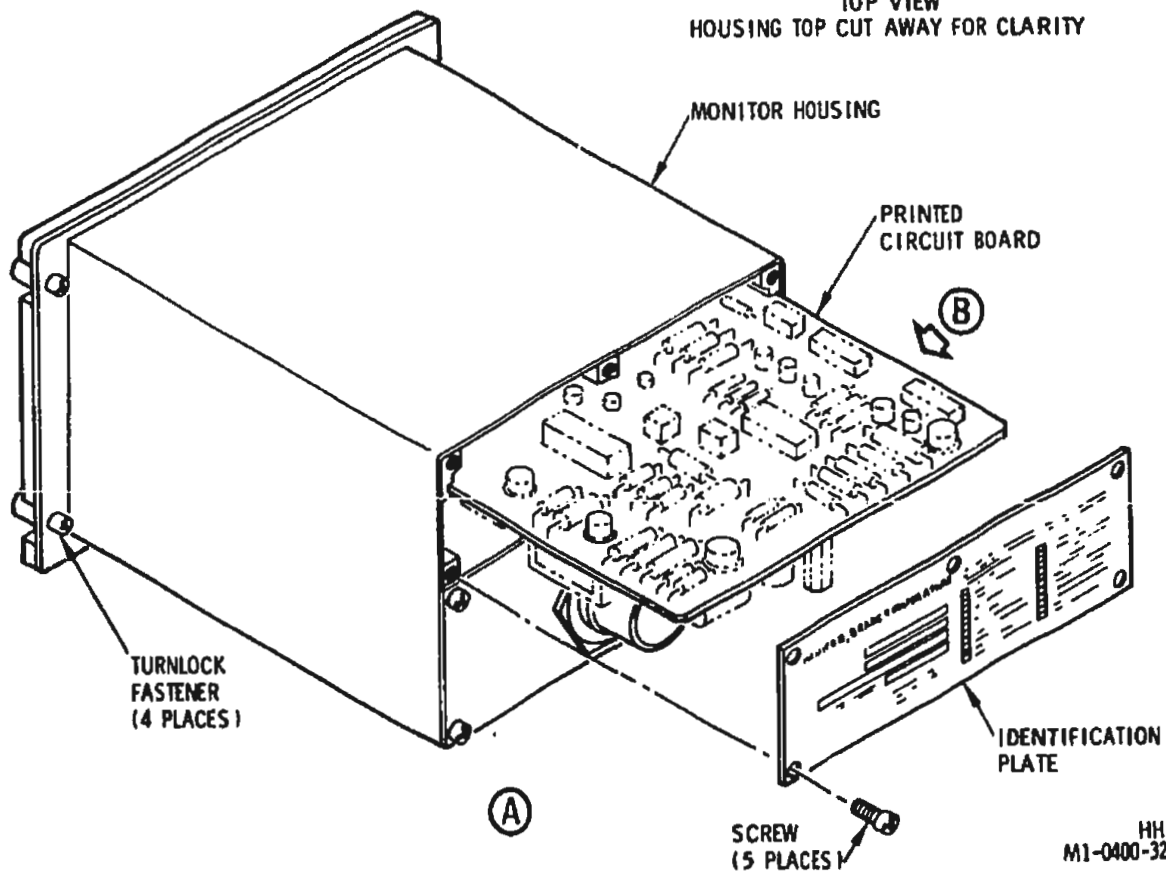


ZONE 215



(B)

TOP VIEW
HOUSING TOP CUT AWAY FOR CLARITY



HH 9285
M1-0400-32-217

**Brake Temperature Monitor Printed Wiring Board
Removal and Installation
Figure 401**

EFFECTIVITY: ALL

32-45-04
Page 402
Apr 1/72

LOCKHEED
MAINTENANCE MANUAL

- R (5) Install monitor into Flight Engineer/Second Officers
R console.
- R (6) Remove tags and close circuit breakers opened in Step
R 2A(1).
- R (7) Perform brake temperature indicating system test (Ref.
R 32-45-00).

R EFFECTIVITY: ALL
R

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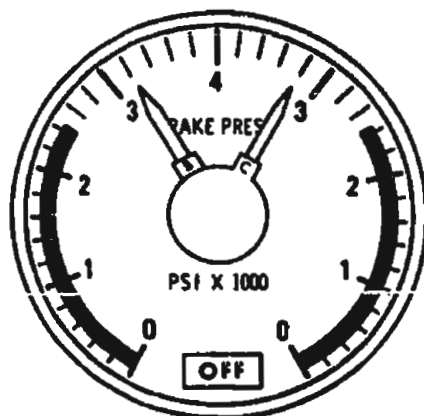
32-45-04
Page 403/404
Apr 1/72

LOCKHEED
MAINTENANCE MANUAL

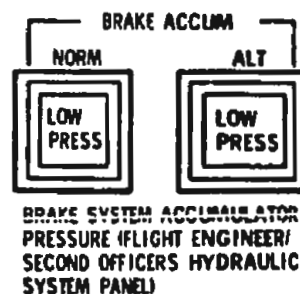
BRAKE PRESSURE INDICATING SYSTEM - DESCRIPTION AND OPERATION

1. General

The brake pressure indicating system (Ref. Fig. 1) provides the Captain and Flight Engineer/Second Officer with brake system pressure readings and low-pressure indication. A dual indicator gage on the Captains instrument panel, zone 211, shows brake system (normal and alternate) pressure. Two indicator lights, normal system and alternate system, (NORM LOW PRESS and ALT LOW PRESS), located on the Flight Engineer/Second Officers overhead panel, zone 215, come on when accumulator pressure falls below 1500 psi. The Captains dual indicator BRAKE PRESS gage is actuated by a transmitter (Ref. Fig. 2) in each of the brake supply module assemblies, zone 147. Each transmitter has an iron core actuated by hydraulic brake pressure which moves the core toward a coil at high pressure. As the core moves toward the coil, inductive reactance and circuit current increase. Movement of the core varies 28V ac applied across the coil, in the return circuit to the indicator, from 10.5 to 15.5V ac. The NORM LOW PRESS and ALT LOW PRESS indicator lights are actuated by a low-pressure switch in each brake supply module assembly.



DUAL BRAKE SYSTEM
PRESSURE INDICATOR
(CAPTAINS MAIN
INSTRUMENT PANEL)



HM 5221
M1-A00-32-091

Brake Pressure Indicators
Figure 1

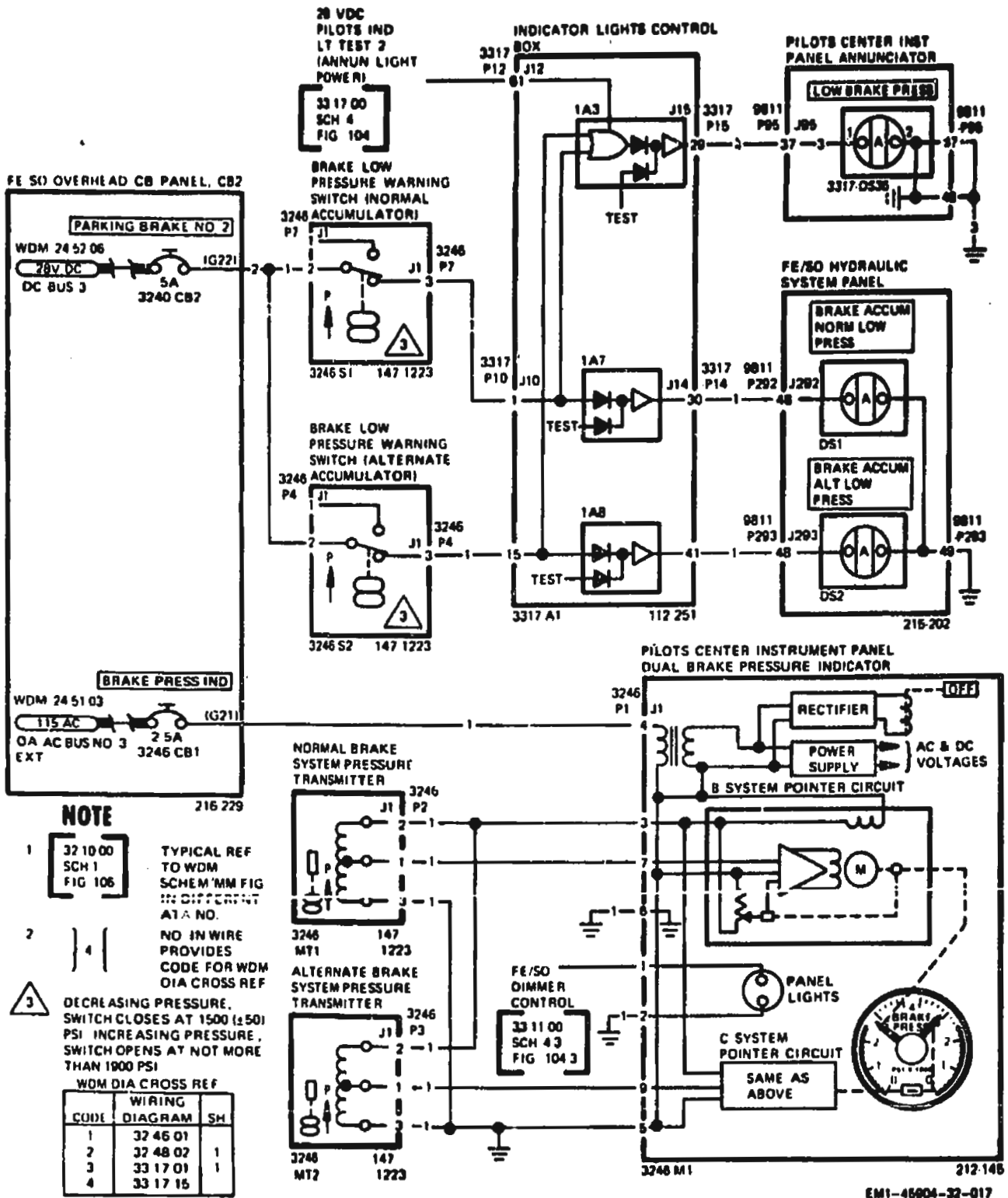
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32-46-00
Page 1
Jan 15/73

0018

LOCKHEED

MAINTENANCE MANUAL



Brake Pressure Indicating System Electrical Schematic Diagram
Figure 2

EFFECTIVITY: ALL

32-46-00
Page 2
May 15/76

LOCKHEED
MAINTENANCE MANUAL

R BRAKE PRESSURE INDICATING SYSTEM - FAULT ISOLATION

R 1. General

R Reference data and fault isolation procedures for
R troubleshooting landing gear system faults are included in this
R section of the manual. A landing gear system malfunction
R detected by the flight crew is normally entered in the aircraft
R flight log book and reported to maintenance personnel by a FIRM
R fault code number. This number and the flight log book write-up
R can be found in the Chapter 32 Fault Code Index. The index
R specifies the maintenance manual section, fault isolation
R diagram figure number and, where appropriate, a block number
R indicating the diagram entry point containing the fault
R isolation procedure. When no block number is specified, the
R diagram entry point is block 1.

R Prerequisites listed at the top of each diagram identify
R mandatory preliminary steps and circuit breakers that must be
R closed before initiating any fault isolation step.

R Schematic diagrams, identified by a SCHEM number, supplement
R fault isolation procedures as maintenance aids. The schematics
R show the basic system circuitry necessary for troubleshooting
R and include cross-reference indexes to the wiring diagram manual
R pages required for checking component interconnect wiring.

R 2. Fault Isolation

R Table 101 is a list of fault isolation data in this section of
R the manual.

Fault Isolation Data Table 101	
FIGURE	TITLE
101	Component Location Index
102	Components Locator Diagram
103	BRAKE ACCUM LOW PRESS light Faults
104	Dual Brake System Pressure Indicator Faults
SCHEM 1	Brake Pressure Indicating System Electrical Schematic

EFFECTIVITY: ALL

32-46-00
Page 101
Mar 15/81

LOCKHEED
MAINTENANCE MANUAL

COMPONENT	QTY	AREA/ACCESS	REFERENCE
CARD, ILCB 1A7	1	FESC; 112AB, 211CB	33-17-04
CARD, ILCB 1A8	1	FESC; 112AB; 211CB	33-17-04
INDICATOR, DUAL BRAKE PRESSURE	1	FLIGHT STATION; P2	32-46-01
SWITCH, HYDRAULIC BRAKE PRESSURE	2	HSC; 147AB	32-46-02
TRANSMITTER, BRAKE PRESSURE	2	HSC; 147AB	32-64-03

M1-0000-32-058

Component Location Index
Figure 101

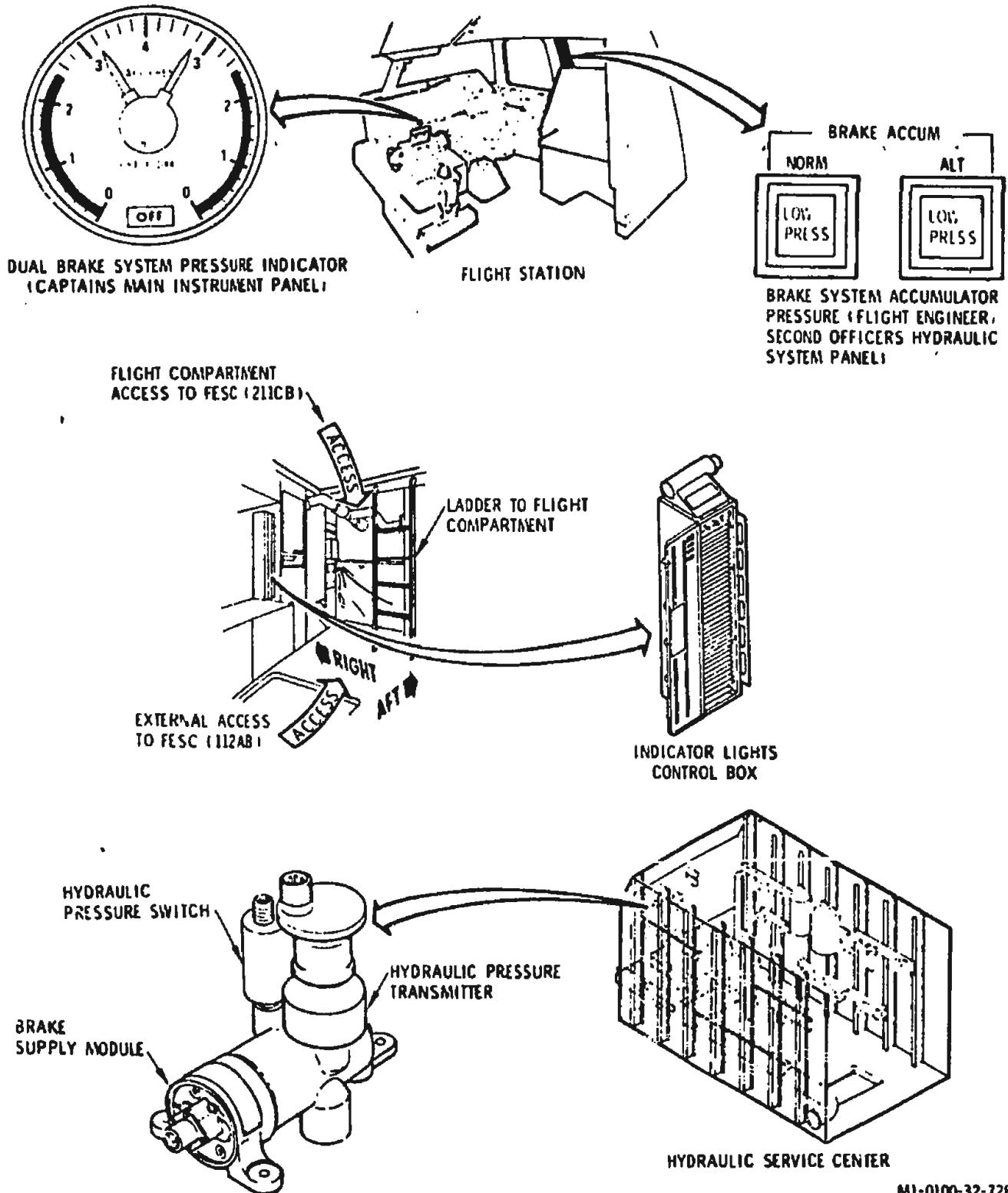
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001B

32-46-00
Page 102
Mar 15/81

LOCKHEED
MAINTENANCE MANUAL



MI-0100-32-728

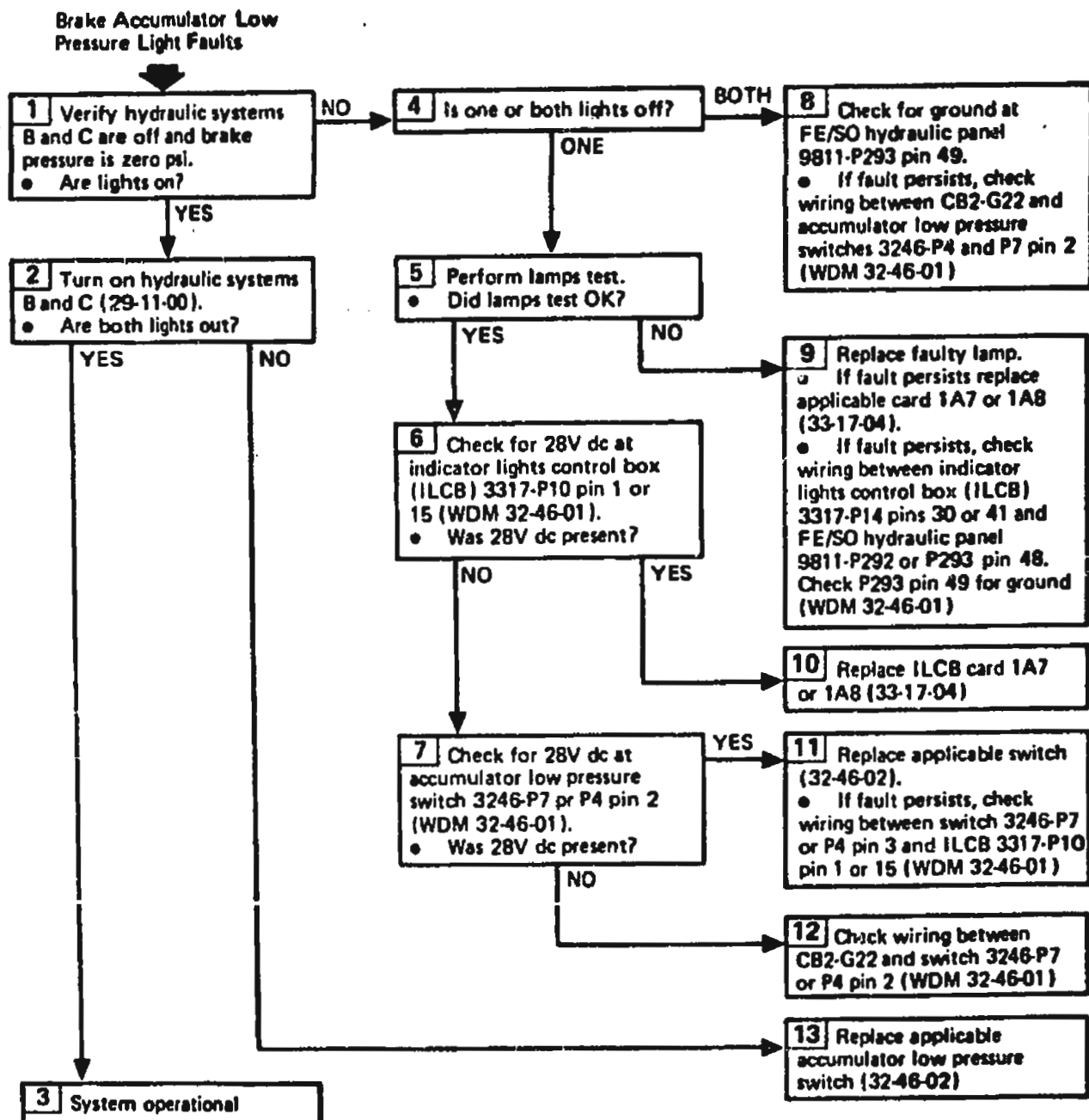
Brake Pressure Indicating System Component Locator
Figure 102

EFFECTIVITY: ALL

32-46-00
Page 103
Mar 15/81

0018

LOCKHEED
MAINTENANCE MANUAL



PREREQUISITES
Electrical Power (24-00-00)
CB's in: CB2-G21, G22

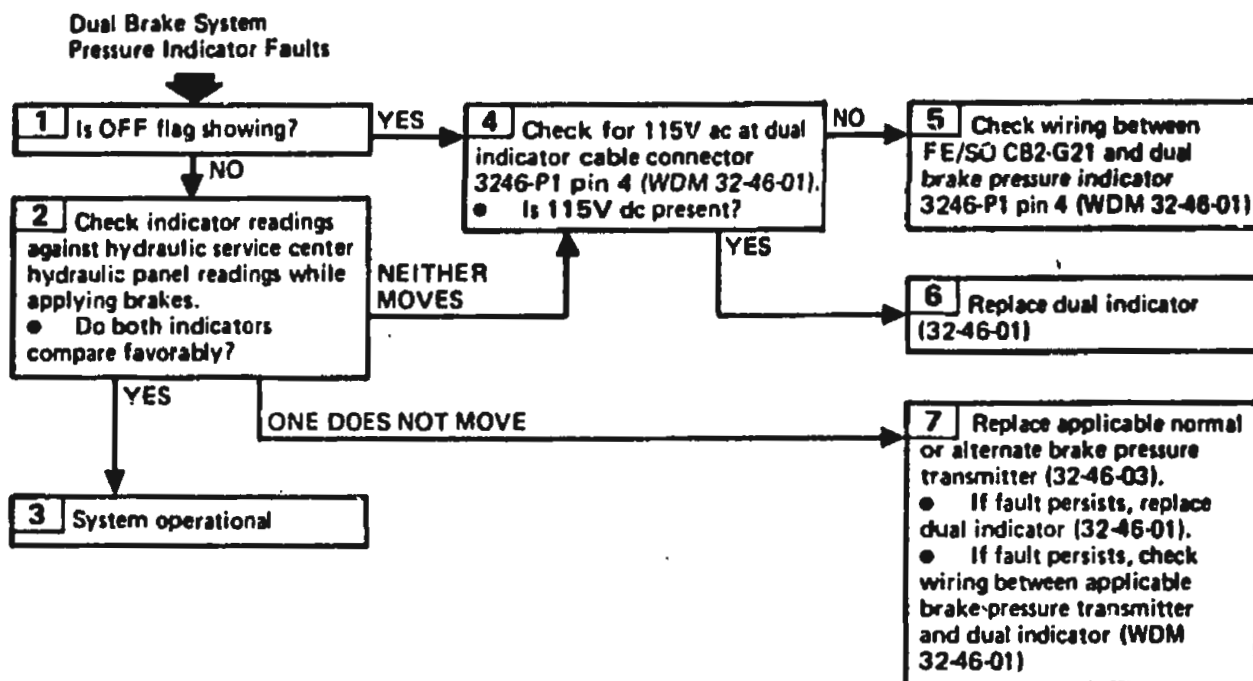
M1-0100-32-007

BRAKE ACCUM LOW PRESS Light Faults
Figure 103

EFFECTIVITY: ALL

32-46-00
Page 104
Mar 15/81

LOCKHEED
MAINTENANCE MANUAL



PREREQUISITES

Hydraulic pressure B and C on to charge accumulators, then off (29-11-00)
Electrical power (24-00-00)
CB's in: CB2-G21

M1-0101-32-601

Dual Brake System Pressure Indicator Faults
Figure 104

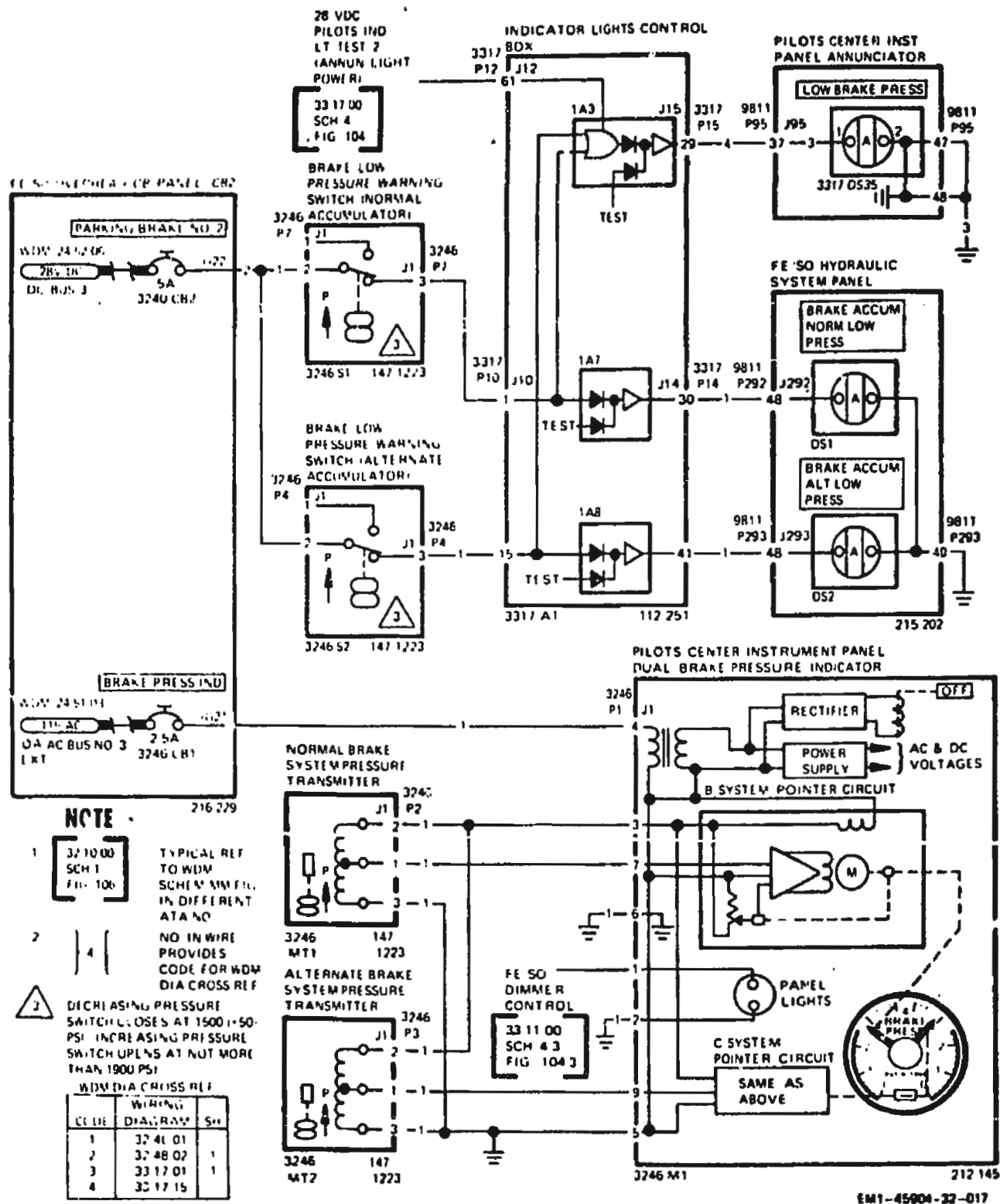
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32-46-00
Page 105
Mar 15/81

R
R
R
001B

LOCKHEED

MAINTENANCE MANUAL



Brake Pressure Indicating System Electrical Schematic
SCHEM 1

EFFECTIVITY: ALL

32-46-00
Page 106
Mar 15/81

LOCKHEED
MAINTENANCE MANUAL

R BRAKE PRESSURE INDICATING SYSTEM - MAINTENANCE PRACTICES

R 1. General

**R The following procedure specifies the method used to deactivate
R an inoperative brake pressure transmitter.**

**R NOTE: This deactivation procedure applies only when an aircraft
R is to be dispatched in accordance with the MEL.**

R 2. Deactivation

**R A. On Flight Engineer/Second Officers circuit breaker panel
R CB2, zone 215, open and tag circuit breaker BRAKE PRESS IND
R (G21).**

R B. Gain access to hydraulic service center.

**R C. At associated brake supply module, disconnect electrical
R connector from pressure transmitter.**

**R D. Install protective caps on both electrical receptacles and
R stow harness.**

R E. Close hydraulic service center access doors.

R F. Remove tag and close circuit breaker opened in Step 2A.

**R G. On pilots center instrument panel adjacent brake pressure
R indicator, placard affected "SYSTEM B (or C) BRAKE PRESSURE
R INDICATOR INOPERATIVE."**

R H. Make appropriate entry in aircraft log book.

R EFFECTIVITY: ALL

001B

32-46-00
Page 201/202
May 15/90

LOCKHEED
MAINTENANCE MANUAL

R DUAL BRAKE SYSTEM PRESSURE INDICATOR -- REMOVAL AND INSTALLATION

R 1. Referenced Procedures

R 24-00-00 Electrical Power - Maintenance Practices

R 29-11-00 Hydraulic Power System - Maintenance Practices

R 2. Removal/Installation

R A. Removal

R (1) On Flight Engineer/Second Officers overhead circuit
R breaker panel CB2, zone 215, open and tag BRAKE PRESS
R IND (G21) circuit breaker.

R (2) On pilots center instrument panel, loosen screw to
R right of indicator which secures it to instrument panel
R (Ref. Fig. 401).

R (3) Withdraw indicator from instrument panel.

R (4) Disconnect electrical connector from back of indicator.

R (5) Remove indicator.

R B. Installation

R (1) Verify that circuit breaker opened in Step A(1) is
R open.

R (2) Connect electrical connector to back of indicator.

R (3) Insert indicator into instrument panel and secure by
R tightening screw.

R (4) Close and remove tag from circuit breaker opened in
R Step A(1).

R (5) Turn on electrical power (Ref. 24-00-00).



MAINTENANCE MANUAL

R

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

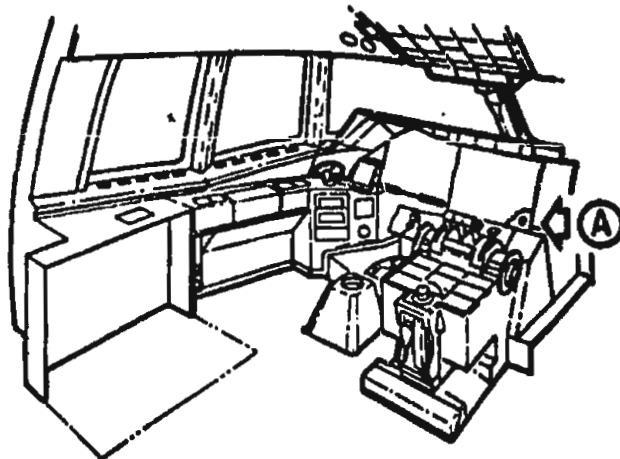
- (6) Turn on hydraulic systems B and C pressure (Ref. 29-11-00).
- (7) Verify that both pointers indicate brake pressure equivalent to hydraulic systems B and C pressure.
- (8) Turn off hydraulic systems B and C pressure (Ref. 29-11-00).
- (9) Turn off electrical power (Ref. 24-00-00).

EFFECTIVITY: ALL

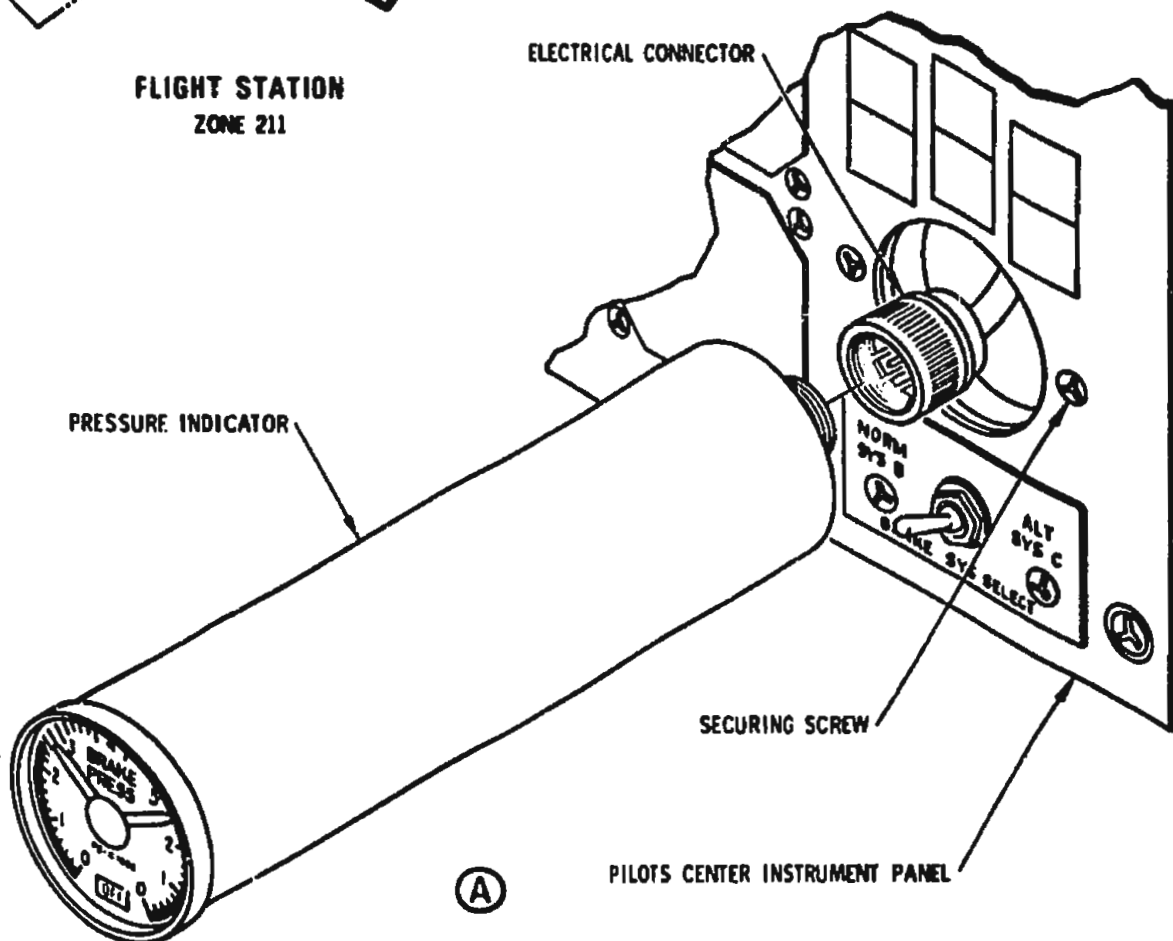
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32-46-01
Page 402
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



FLIGHT STATION
ZONE 211



M1-0100-32-602

R Dual Brake System Pressure Indicator - Removal and Installation
R Figure 401

R EFFECTIVITY: ALL
R
001B

32-46-01
Page 403/404
May 15/76

LOCKHEED
MAINTENANCE MANUAL

HYDRAULIC (BRAKE) PRESSURE SWITCH - REMOVAL AND INSTALLATION

1. Equipment and Materials

Lock-wire, QQ-W-390, 0.020-inch diameter or equivalent

2. Referenced Procedures

24-00-00 Electrical Power - Maintenance Practices

29-11-00 Hydraulic Power System - Maintenance Practices

32-43-00 Main Landing Gear Brake System - Maintenance Practices

3. Removal/Installation

A. Removal

- (1) Turn on electrical power (Ref. 24-00-00).
- (2) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, ensure that circuit breakers PARKING BRAKE NO. 1 (G18), PARKING BRAKE NO. 2 (G22), and BRAKE PRESS IND (G21) are closed.
- (3) On pilots center instrument panel, zone 210, place BRAKE SYS SELECT switch in NORM SYS B or ALT SYS C position, as applicable.

CAUTION: MAIN LANDING GEAR WHEELS MUST BE CHOCKED FORWARD AND AFT BEFORE REDUCING BRAKE SYSTEM PRESSURE.

- (4) Turn off applicable hydraulic system B or C pressure (Ref. 29-11-00).
- (5) Depress brake pedals until brake pressure is 0 psi.
- (6) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker PARKING BRAKE NO. 2 (G22).
- (7) Open hydraulic service center access doors 147AB and 147BB.
- (8) At brake supply module, disconnect electrical leads at connector.

R EFFECTIVITY: ALL

001B

32-46-02
Page 401
Dec 1/72

LOCKHEED
MAINTENANCE MANUAL

- (9) Remove pressure switch (Ref. Fig. 401).
- (10) Turn off electrical power (Ref. 24-00-00).

B. Installation

- (1) Verify that circuit breaker opened in Step 3A(6) is open and tagged.
- (2) Screw pressure switch into brake supply module, and tighten and secure with lock-wire (Fig. 401).
- (3) Install electrical connector.
- (4) Remove tag and close circuit breaker opened in Step 3A(6).

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

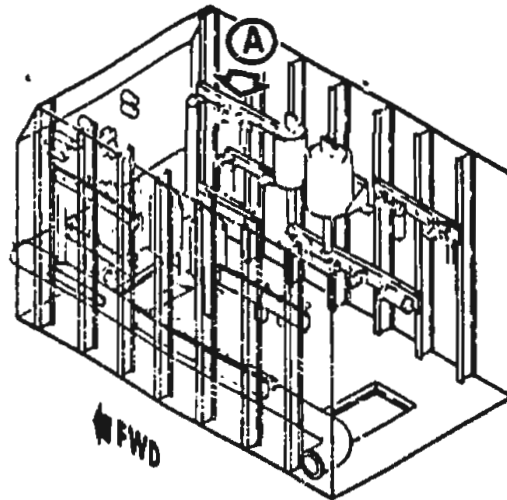
LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

TRAVEL AREAS OF ALL FLIGHT CONTROL SURFACES AND MAIN GEAR DOORS ARE CLEAR OF PERSONNEL AND GROUND EQUIPMENT.

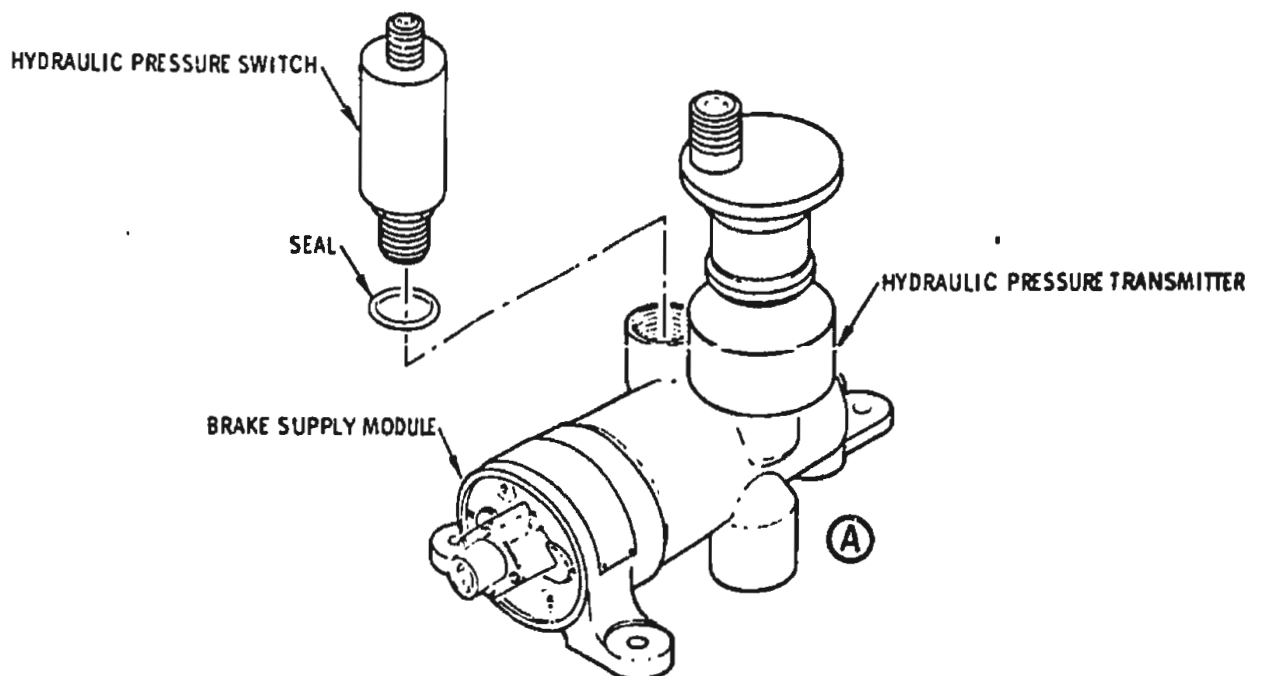
THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (5) Turn on applicable hydraulic system B or C pressure (Ref. 29-11-00).
- (6) Close hydraulic service center access doors.
- (7) Bleed brake system (Ref. 32-43-00).
- (8) Turn off applicable hydraulic system B or C pressure (Ref. 29-11-00).

LOCKHEED
MAINTENANCE MANUAL



HYDRAULIC SERVICE CENTER
ZONE 147



M1-0001-32-226

R Hydraulic (Brake) Pressure Switch - Removal and Installation
R Figure 401

EFFECTIVITY: ALL

32-46-02
Page 403/404
Dec 15/80

001B

LOCKHEED
MAINTENANCE MANUAL

BRAKE PRESSURE TRANSMITTER- REMOVAL AND INSTALLATION

1. Equipment and Materials

Lock-wire, QQ-W-390, 0.020-inch diameter, or equivalent

2. Referenced Procedures

24-00-00 Electrical Power - Maintenance Practices

29-11-00 Hydraulic Power System - Maintenance Practices

32-43-00 Main Landing Gear Brake System - Maintenance Practices

3. Removal/Installation

A. Removal

- (1) Turn on electric power (Ref. 24-00-00).
- (2) On Flight Engineer/Second Officers circuit breaker panel CB2, zone 215, ensure that circuit breakers PARKING BRAKE NO. 1 (G18), PARKING BRAKE NO. 2 (G22), and BRAKE PRESS IND (G21) are closed.

CAUTION: MAIN LANDING GEAR WHEELS MUST BE CHOCKED FORWARD AND AFT BEFORE REDUCING BRAKE PRESSURE.

- (3) Turn off applicable hydraulic system B or C pressure (Ref. 29-11-00).
- (4) Depress brake pedals until brake pressure is 0 psi.
- (5) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker BRAKE PRESS IND (G21).
- (6) Open hydraulic service center access doors 147AB and 147BB.
- (7) At brake supply module, disconnect electrical leads at connector.
- (8) Remove pressure transmitter (Ref. Fig. 401).
- (9) Turn off electrical power (Ref. 24-00-00).

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0018 EFFECTIVITY: ALL

32-46-03
Page 401
Dec 1/72

LOCKHEED
MAINTENANCE MANUAL

B. Installation

- (1) Verify that circuit breaker opened in Step 3A(6) is open and tagged.
- (2) Screw pressure transmitter into brake supply module, and tighten and secure with lock-wire.
- (3) Install electrical connector.
- (4) Remove tag and close circuit breaker opened in Step 3A(6).

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

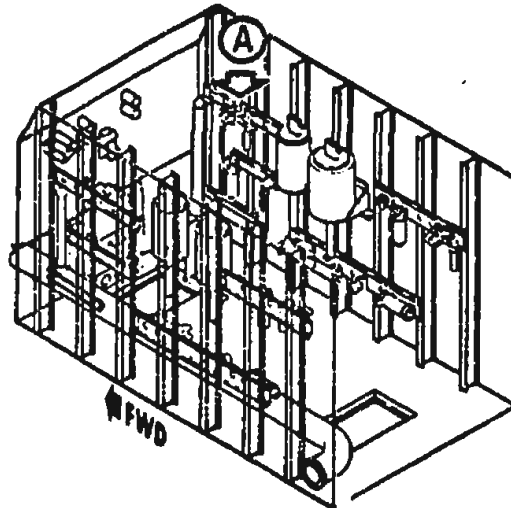
THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (5) Turn on applicable hydraulic system B or C pressure (Ref. 29-11-00).
- (6) Turn on electrical power (Ref. 24-00-00).
- (7) Bleed brake system (Ref. 32-43-00).
- (8) Turn off applicable hydraulic system B or C pressure (29-11-00).
- (9) Turn off electrical power (Ref. 24-00-00).
- (10) Close hydraulic service center access doors.

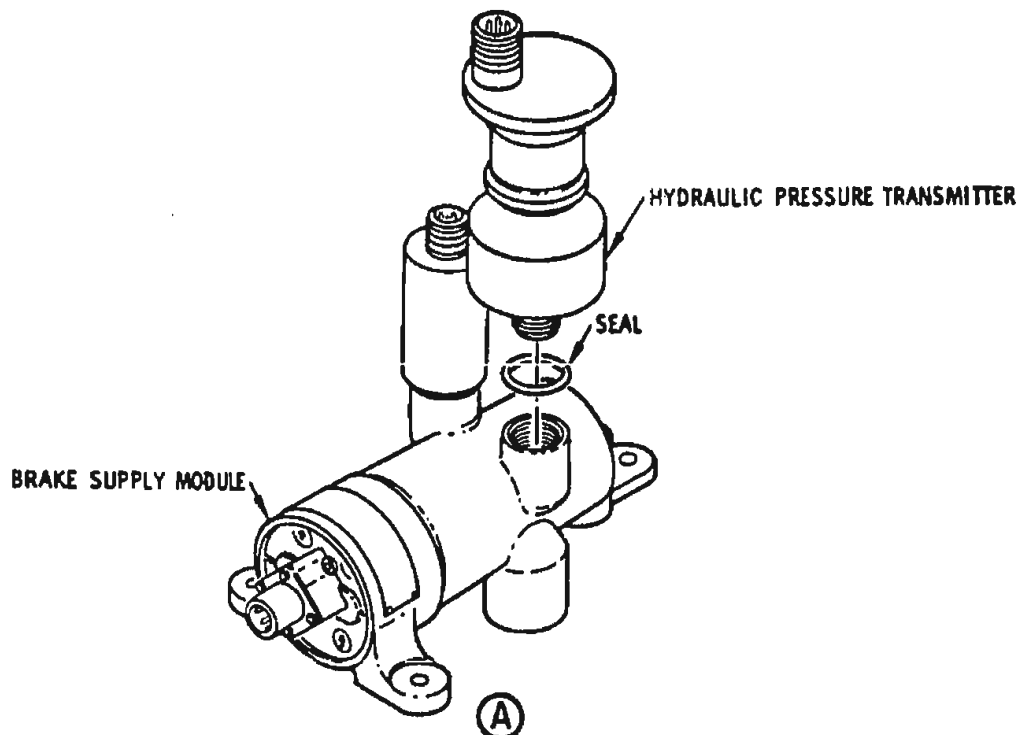
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32-46-03
Page 402
Mar 15/80

LOCKHEED
MAINTENANCE MANUAL



HYDRAULIC SERVICE CENTER
ZONE 147



M1-0002-32-096

R
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Brake Hydraulic Transmitter - Removal and Installation
Figure 401

EFFECTIVITY: ALL

001B

32-46-03
Page 403/404
Dec 15/80

LOCKHEED
MAINTENANCE MANUAL

R TRANSDUCER - AIDS APPLIED BRAKE PRESSURE - REMOVAL AND INSTALLATION

R 1. Equipment and Materials

R NAS 1612-4 Packing

R 2. Referenced Procedures

R 24-00-00 Electrical Power - Description & Operation

R 29-11-00 Hydraulic Power System - Description & Operation

R 32-43-00 Main Landing Gear Brake System - Adjustment & Test

R 3. Removal/Installation

R A. Removal

R (1) Turn on aircraft electrical power (Ref. 24-00-00).

**R (2) On Flight Engineer/Second Officer's (FE/SO) overhead
R circuit breaker panel CB2, zone 215, verify the
R following circuit breakers are closed:**

R (G18) PARKING BRAKE NO. 1

R (G21) BRAKE PRESS IND

R (G22) PARKING BRAKE NO. 2

**R (3) On pilot's center instrument panel, Zone 210, place
R BRAKE SYS SELECT switch in NORM SYS B position.**

R (4) Chock main landing gear wheels forward and aft.

**R WARNING: MAIN LANDING GEAR WHEELS MUST BE CHOCKED
R FORWARD AND AFT BEFORE REDUCING BRAKE SYSTEM
R PRESSURE.**

**R (5) Verify hydraulic system B pressure is off (Ref.
R 29-11-00).**

R (6) Depress brake pedals until BRAKE PRESSURE B is 0 psi.

**R (7) On pilot's center instrument panel, Zone 210, place
R BRAKE SYS SELECT switch in ALT SYS C position.**

R EFFECTIVITY: ALL

001B

32-46-05
Page 401
Mar 15/91



MAINTENANCE MANUAL

- R (8) Verify hydraulic system C pressure is off (Ref.
R 29-11-00).
- R (9) Depress brake pedals until BRAKE PRESSURE C is 0 psi.
- R (10) Turn off electrical power (Ref, 24-00-00).
- R (11) On FE/SO vertical circuit breaker panel, CB3, open and
R tag the following circuit breakers:
- R (H11) AIDS/FLT RCDR
- R (H12) AIDS/FLT RCDR
- R (H13) AIDS/FLT RCDR
- R (12) Tag FE/SO hydraulic system panel, Zone 215, to prevent
R use of the hydraulic system during the repair
R procedure.
- R WARNING: BEFORE ENTERING THE HYDRAULIC SERVICE CENTER,
R ENSURE THAT B AND C HYDRAULIC SYSTEMS ARE
R SHUT OFF.
- R (13) Open hydraulic service center doors 147AB or 147BB.
- R (14) Tag hydraulic service panel to prevent use of the
R hydraulic system until transducers are reinstalled.
- R (15) Remove electrical connector from inoperative brake
R pressure transducer (Ref. Fig. 401).
- R (16) Position fluid container under affected transducer.
- R (17) Remove brake pressure transducer from tee.
- R (18) Cover tee cavity to prevent contamination.
- R B. Installation
- R (1) Verify circuit breakers tagged in step 3.A.(10) are
R still open, hydraulic service panel is placarded, and
R all hydraulic systems are off.
- R (2) Gain access to hydraulic service center.
- R (3) Remove protective covering from tee cavity.
- R (4) Install new packing.
- R (5) Install brake pressure transducer.

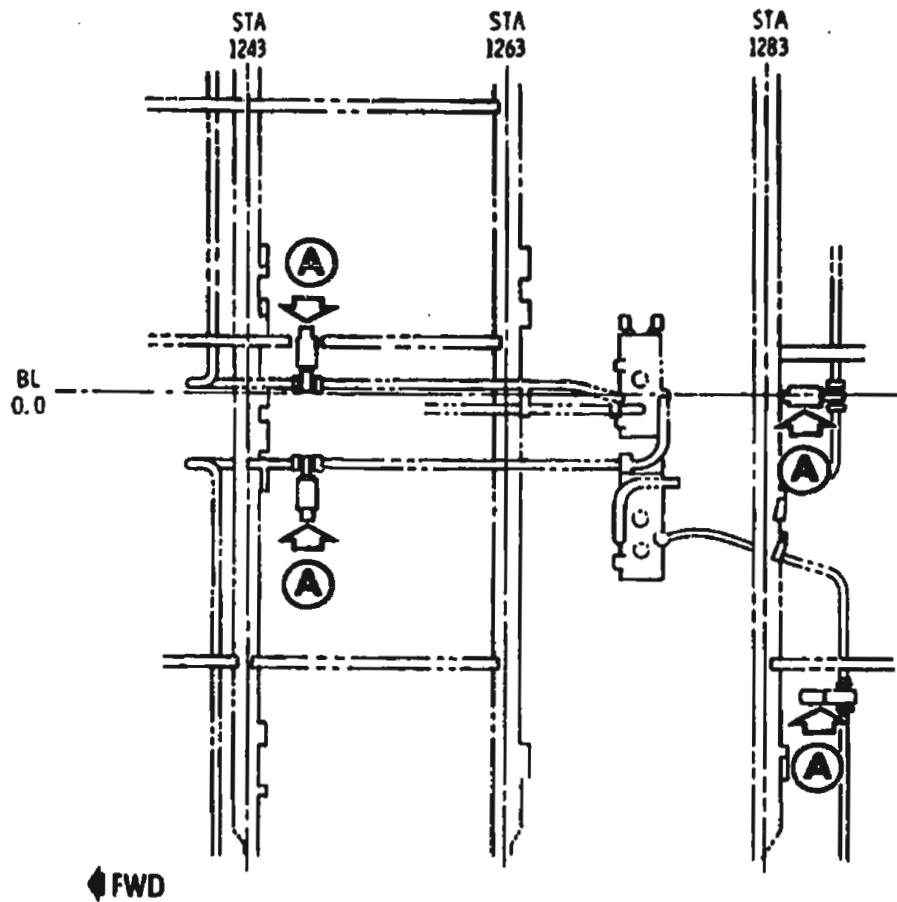
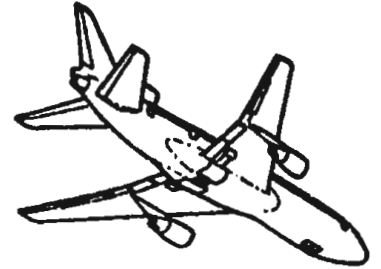
R EFFECTIVITY: ALL
R

001B



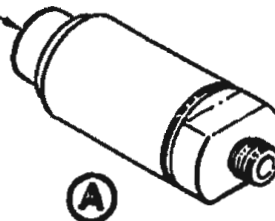
- R (6) Connect electrical connector to receptacle on brake
R pressure transducer.
- R (7) Remove tags installed in steps 3.A.(13), 3.A.(11) and
R 3.A.(10), and close circuit breakers opened in step
R 3.A.(10).
- R (8) Turn on aircraft electrical power (Ref. 24-00-00).
- R (9) On pilot's center instrument panel, place BRAKE SYS
R SELECT switch in NORM SYS B position.
- R **WARNING:** VERIFY THE FOLLOWING BEFORE PRESSURING ANY
R HYDRAULIC SYSTEM:
- R LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY
R DEVICES ARE INSTALLED.
- R TRAVEL AREAS OF ALL FLIGHT CONTROL SURFACES AND
R MAIN GEAR DOORS ARE CLEAR OF PERSONNEL AND GROUND
R EQUIPMENT.
- R THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT
R HYDRAULIC PRESSURE.
- R (10) Turn on hydraulic system B pressure (Ref. 29-11-00).
- R (11) Bleed brake system (Ref. 32-43-00).
- R (12) Bleed air from hydraulic system B (Ref. 29-11-00).
- R (13) Turn off hydraulic system B (Ref. 29-11-00).
- R (14) On pilot's center instrument panel, place BRAKE SYS
R SELECT switch in ALT SYS C position.
- R (15) Repeat steps 3.B.(10) through 3.B.(13) using hydraulic
R system C.
- R (16) Turn off electrical power (Ref. 24-00-00).
- R (17) Close hydraulic service center doors 147AB and 147BB.

LOCKHEED
MAINTENANCE MANUAL



PLAN VIEW OF HYDRAULIC SERVICE CENTER

ELECTRICAL RECEPTACLE



M1 0000-32-3081

Brake Pressure Transducer - Removal/Installation
Figure 401

R
R

R EFFECTIVITY: ALL
R

001B

32-46-05
Page 404
Mar 15/91



R

PARKING BRAKE SYSTEM - DESCRIPTION AND OPERATION**1. Description**

The parking brake system provides a means to hold the normal system brakes in an applied condition. The parking brake control (Ref. Fig. 1), zone 211, is available to both pilots. The system consists of a flexible push-pull control shaft, locking pawls, a mechanically actuated switch, a hydraulic pressure actuated switch, and two brake system return shutoff valves. Two warning lights on the pilots center console, zone 210, indicate when the parking brakes are set and adequate brake hydraulic pressure is available.

On aircraft 032-999, complete electrical isolation between the two parking brake circuits is provided so that anti-skid control will remain operative if either 28VDC circuit breaker opens (Ref. Fig. 3).

Brake return line check valves are installed in the return line between the right and left brake control modules, and the return shutoff valves to prevent cross flow back to return.

On aircraft 001-014, the flexible push-pull control shaft connects the parking brake PARK knob to the parking brake locking pawls in the brake input mechanism (Ref. Fig. 2). The locking pawls hold the brake quadrants in the brakes applied condition. The parking brake indicating circuit consists of a mechanical switch operated by one of the locking pawls, and a hydraulic switch connected in series through the indicator lights control box to the PARK SELECT B SYS and PARK indicator lights (Ref. Fig. 3).

On aircraft 015-999, the flexible push-pull control shaft connects the parking brake PARK knob to the parking brake input mechanism (Ref. Fig. 2). A cable connects the parking brake input mechanism to locking pawls in the hydraulic service center. The parking brake indicating circuit consists of a mechanical switch operated by the input bellcrank which energizes the parking brake switch relay (Ref. Fig. 3). The parking brake switch relay in series with the hydraulic switch is connected through the indicator lights control box to the PARK SELECT B SYS and PARK indicator lights.

Two brake system antiskid return shutoff valves in parallel provide blocking of hydraulic return flow. Hydraulic pressure is supplied by hydraulic system B to the normal brake system accumulator. Adequate pressure ranges from a system pressure of 3000 psi to a minimum pressure of 900 psi. When hydraulic

EFFECTIVITY: ALL

001B

32-48-00
Page 1
Mar 15/83



system B pressure is available, there is constant hydraulic pressure applied to the brake assemblies. When hydraulic system B pressure is not available, internal system leakage causes a gradual diminishment of the fluid supply stored in the normal brake system accumulator. As fluid is diminished, pressure decreases to the point where adequate pressure is not available for parking brake operation.

2. Operation

The parking brake system is part of the normal brake system. To have parking brakes applied, brake pedals must be depressed, the brake system must be selected to the normal system (both brake supply valves deenergized), normal brake accumulator pressure must be adequate, the landing gear control lever must be in the DOWN position, and both normal brake system shutoff valves must be closed (electrically deenergized).

On aircraft 001-014,
depressing the brake pedals rotates the brake input quadrants to a position that places the hub detents in alignment with the pawls (Ref. Fig. 2).

Pulling out the parking brake control positions the pawls into the hub detents so that when pressure at the brake pedals is released, the brake input quadrants remain in a brakes on condition. Rotation of the brake input quadrants actuates the mechanical parking brake switch (Ref. Fig. 3).

On aircraft 015-999,
depressing the brake pedals rotates the brake bellcrank which in turn rotates the rotating stop.

Pulling out the parking brake control positions the locking bellcrank so that the bolt is in alignment with the rotating stop. When brake pedal pressure is released, the bolt prevents the rotating stop from allowing the brake bellcrank to return to the brakes off position. Rotation of the locking bellcrank actuates the mechanical parking brake switch (Ref. Fig. 3).

On aircraft 001-014,
actuation of the mechanical parking brake switch closes the circuit to the parking brake hydraulic switch which, being closed because of hydraulic pressure, applies electrical power through the indicator lights control box to the parking brake indicator lights, turning them on.

On aircraft 015-999,
actuation of the mechanical parking brake switch de-energizes the parking brake switch relay. De-energizing the parking brake switch relay closes the circuit to the parking brake hydraulic

EFFECTIVITY: ALL

32-48-00

Page 2

May 15/87



MAINTENANCE MANUAL

switch, which, being closed because of hydraulic pressure, applies electrical power through the indicator lights control box to the parking brake indicator lights, turning them on.

Actuation of the mechanical parking brake switch also opens the electrical circuit to the antiskid control monitor and the brake system BRAKE SYS SELECT switch. Opening the electrical circuit to the antiskid control monitor ensures that no electrical power is applied to the normal shutoff valve relay coils in the event the antiskid control monitor is turned on. With the normal shutoff valve relays in the off position, electrical power cannot be applied to energize the normal shutoff valves. The valves are therefore closed and parking brakes can be applied provided that adequate brake system hydraulic pressure is available. When hydraulic system B pressure is not available, the length of time in which adequate hydraulic pressure will be available for parking is dependent upon the accumulator pressure when parking brakes are applied. The higher the pressure, the longer time that parking brakes will be on. The relationship between accumulator pressure and parking brake duration is shown in Figure 4.

The PARK SELECT B SYS and PARK indicator lights are for the purpose of indicating that when the parking operation is initiated, the locking pawls are latched into position and that adequate applied brake pressure is available at that time. The brake pressure gages are used to verify that adequate pressure is available.

Opening the electrical circuit to the BRAKE SYS SELECT switch ensures that no electrical power is applied to the normal brake system brake supply valve in the event the BRAKE SYS SELECT switch is in the ALT SYS C position. With the brake supply valve deenergized, hydraulic pressure is available for parking brake application.

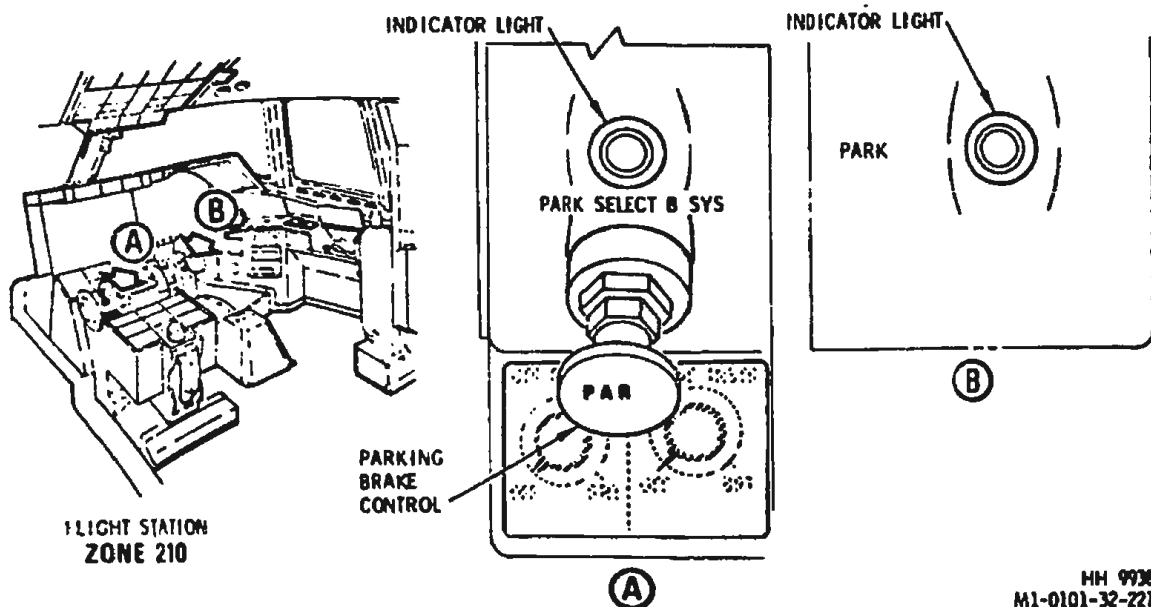
The conditions required for parking brake application are satisfied as follows provided normal accumulator pressure is adequate and the landing gear control lever is in the DOWN position:

Brake pedals depressed and locked.

Normal brake system selected (normal brake supply valve deenergized).

Both normal brake system shutoff valves closed (electrically deenergized).

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MAINTENANCE MANUAL



HM 9938
M1-0101-32-227

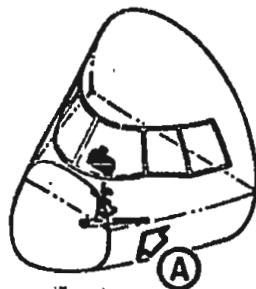
Parking Brake Control and Indicator Light
Figure 1

R
R
001B

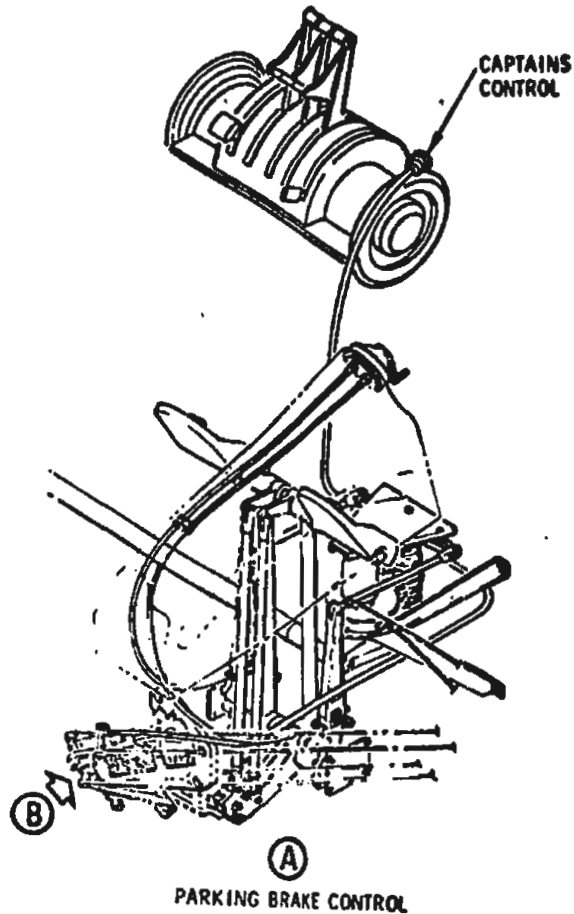
EFFECTIVITY: ALL

32-48-00
Page 4
Aug 15/74

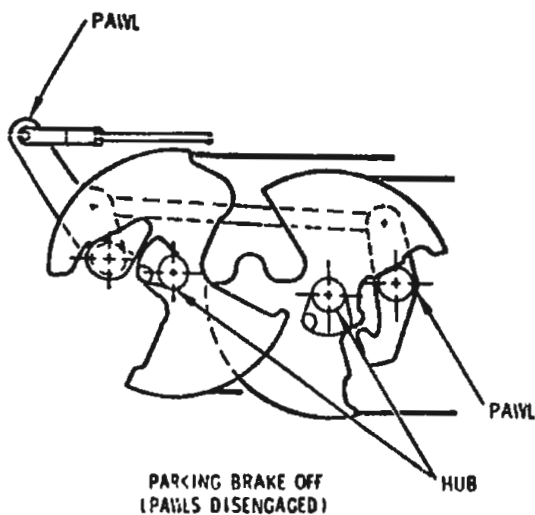
LOCKHEED
MAINTENANCE MANUAL



FLIGHT STATION
ZONE 210

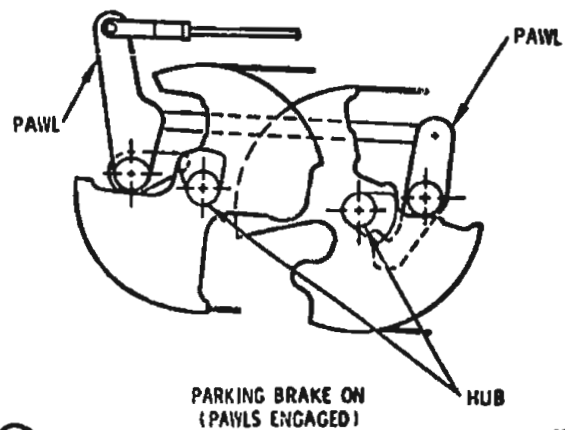


PARKING BRAKE CONTROL



PARKING BRAKE OFF
(PAWLS DISENGAGED)

(B)

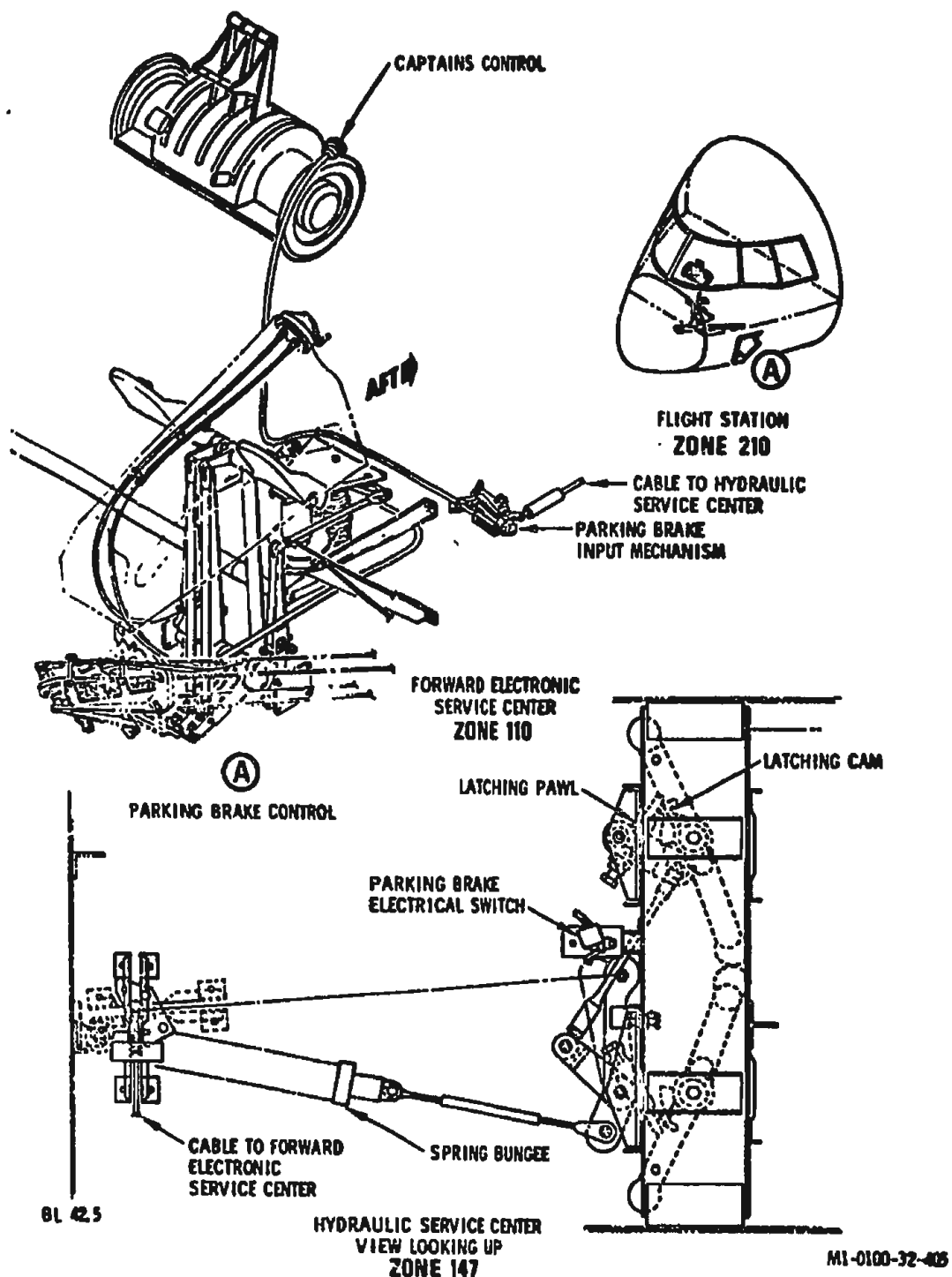


PARKING BRAKE ON
(PAWLS ENGAGED)

HH 5328
M1-0101-32-092

Parking Brake Mechanism
Figure 2

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MAINTENANCE MANUAL



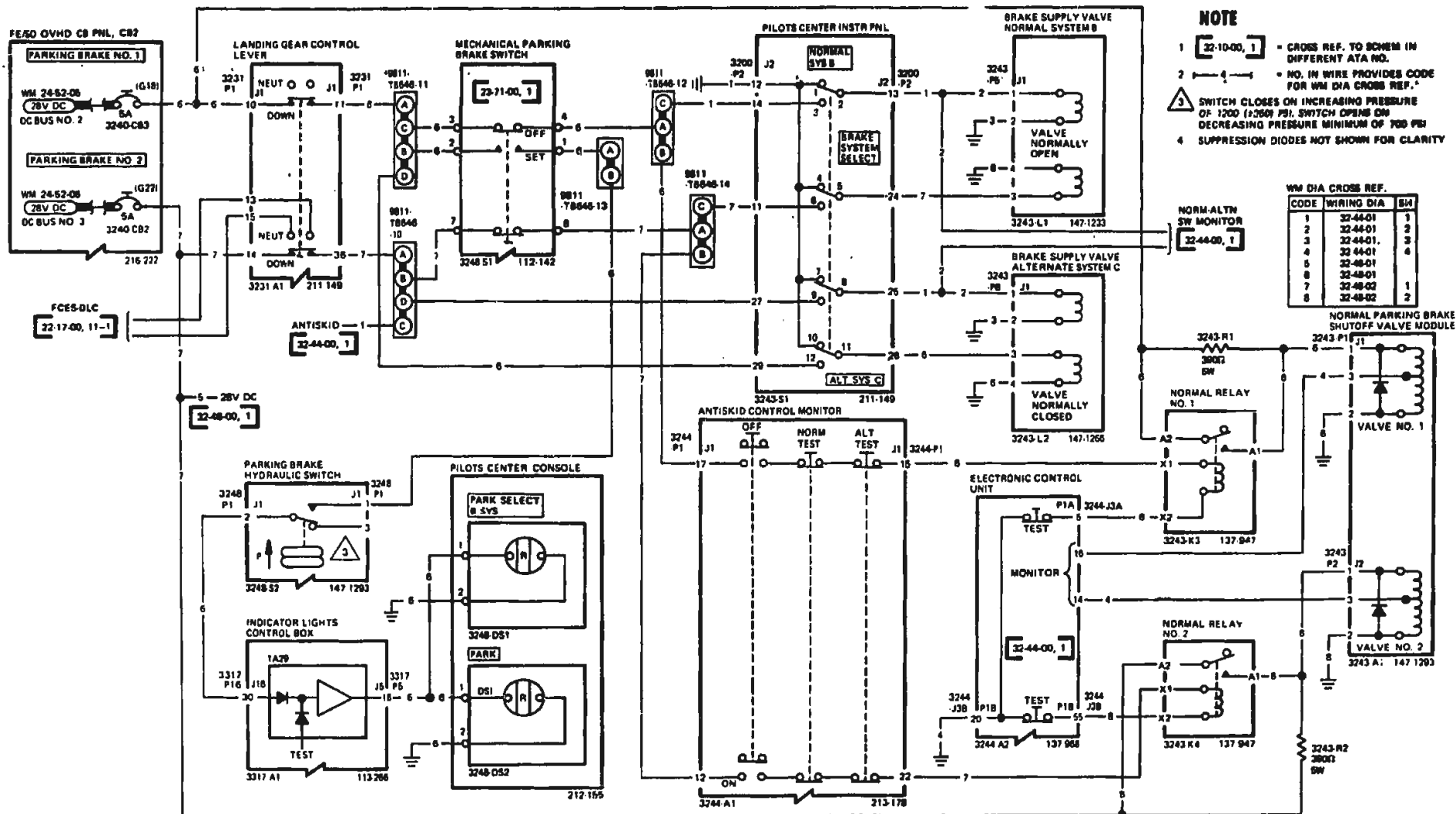
Parking Brake Mechanism
Figure 2

EFFECTIVITY: 015-999

32-48-00
 Page 6
 Aug 15/74

R
 R
 001B

LOCKHEED
MAINTENANCE MANUAL



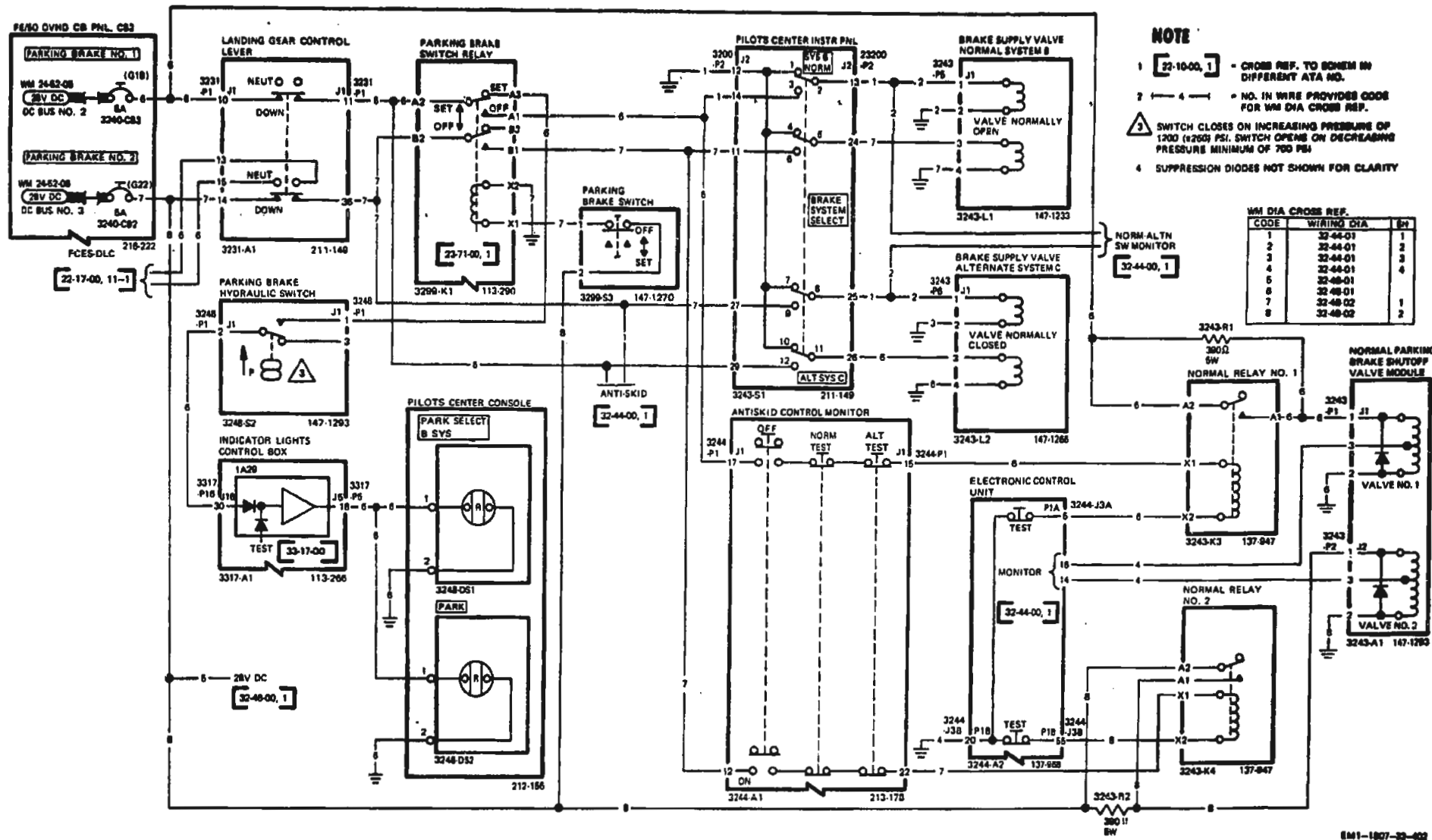
EM1-63008-32-014

Parking Brake Indicator Light Electrical Schematic
Figure 3

EFFECTIVITY: 001-014

32-48-00
Page 7/8
Aug 15/82

0018

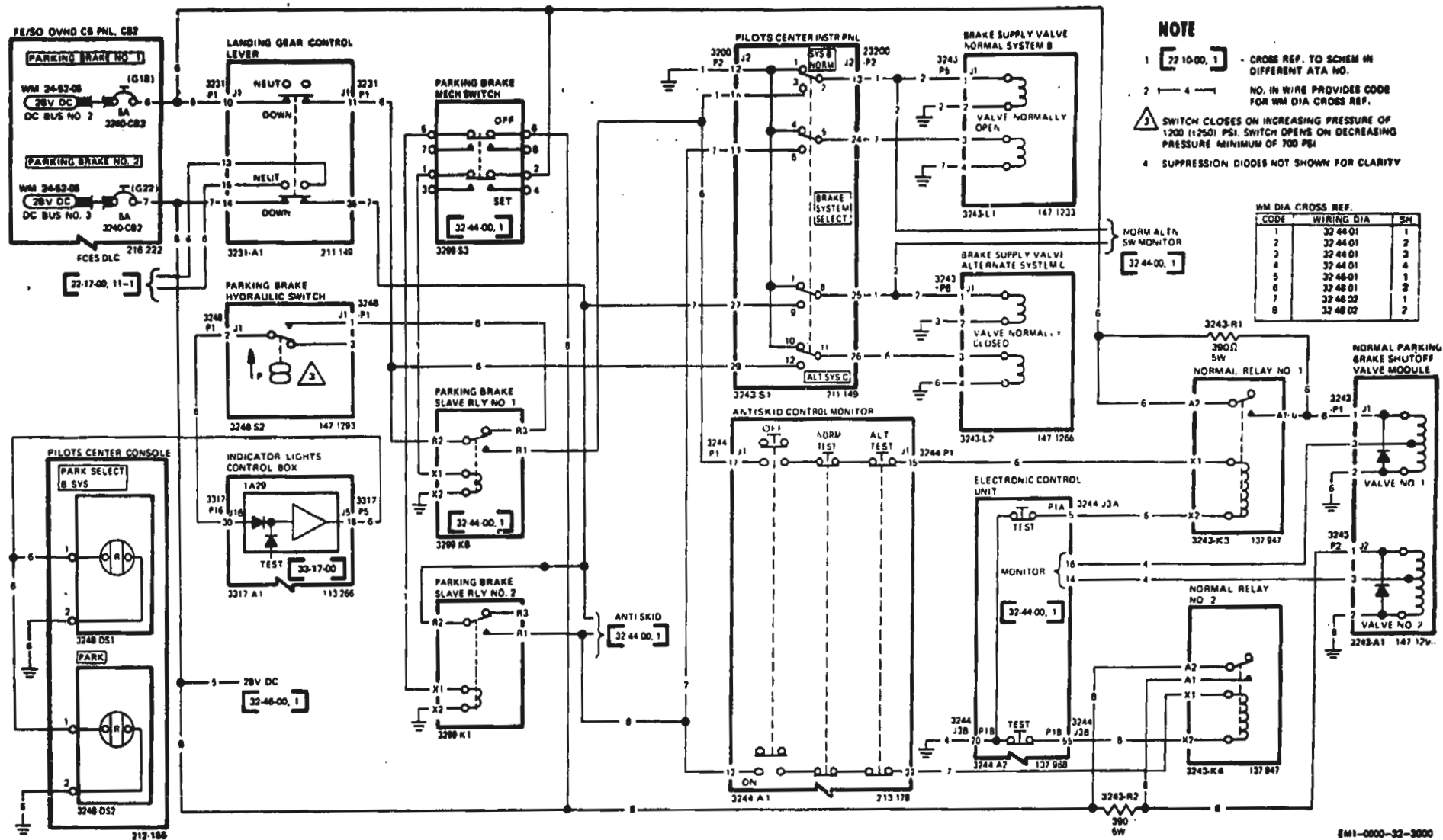


Parking Brake Indicator Light Electrical Schematic
Figure 3

EFFECTIVITY: 015-031

32-48-00
Page 9/10
Nov 15/84

6M1-1807-33-002

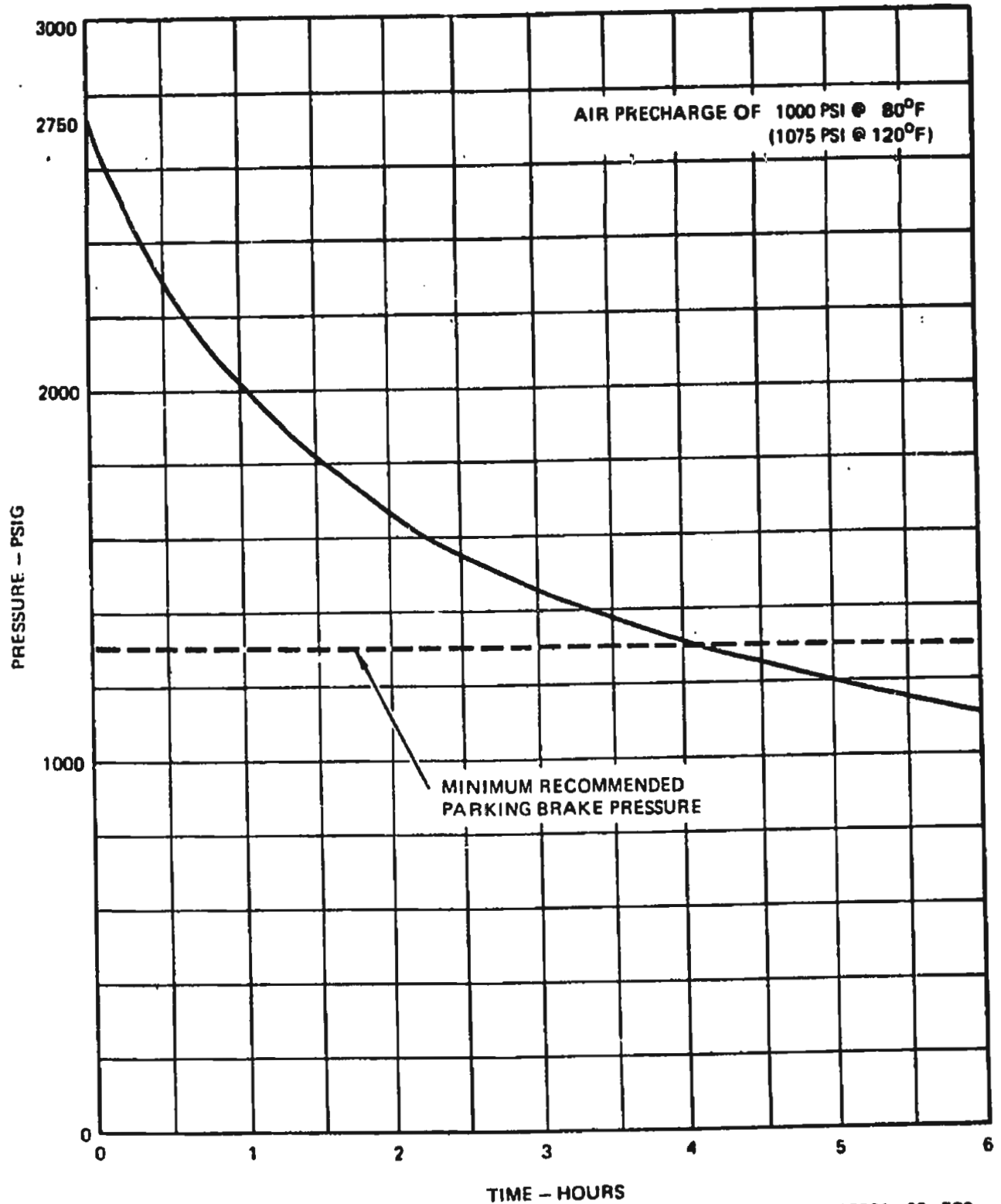


Parking Brake Indicator Light Electrical Schematic
Figure 3

EFFECTIVITY: 032-999

32-48-00
Page 11/12
Nov 15/84

LOCKHEED
MAINTENANCE MANUAL



M1-18201-32-529

Parking Brake Pressure Decay Chart
Figure 4

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001B EFFECTIVITY: ALL

32-48-00
Page 13/14
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL

R PARKING BRAKE SYSTEM--FAULT ISOLATION

R 1. General

R Reference data and fault isolation procedures for
R troubleshooting landing gear system faults are included in this
R section of the manual. A landing gear system malfunction
R detected by the flight crew is normally entered in the aircraft
R flight log book and reported to maintenance personnel by a FIRM
R fault code number. This number and the flight log book write-up
R can be found in the Chapter 32 Fault Code Index. The index
R specifies the maintenance manual section, fault isolation
R diagram figure number and, where appropriate, a block number
R indicating the diagram entry point containing the fault
R isolation procedure. When no Block number is specified, the
R diagram entry point is Block 1.

R Prerequisites listed at the top of each diagram identify
R mandatory preliminary steps and circuit breakers that must be
R closed before initiating any fault isolation step.

R Schematic diagrams, identified by a SCHEM number, supplement
R fault isolation procedures as maintenance aids. The schematics
R show the basic system circuitry necessary for troubleshooting
R and include cross-reference indexes to the wiring diagram manual
R pages required for checking component interconnect wiring.

R 2. Fault Isolation

R Table 101 is a list of fault isolation data in this section of
R the manual.

Parking Brake System Fault Isolation
Table 101

FIGURE	TITLE
101	Component Location Index
102	Parking Brake System Components Locator Diagram
103	Brake Hydraulic Pressure Bleeds Down Rapidly
104	Parking Brake Indicator Lights Do Not Come On
105	Parking Brake Release Abnormal
106	Parking Brake Will Not Set

R EFFECTIVITY: ALL

32-48-00
Page 101
Mar 15/81

LOCKHEED



MAINTENANCE MANUAL

Parking Brake System Fault Isolation (Cont)
Table 101

FIGURE	TITLE
107	With Parking Brake Set, Park Knob Retracts to Off Position
R	SCHEM 1 Parking Brake System Electrical Schematic

EFFECTIVITY: ALL

001B

32-48-00
Page 102
Aug 15/81

LOCKHEED



MAINTENANCE MANUAL

COMPONENT	QTY	AREA/ACCESS	REFERENCE
BOX, INDICATOR LIGHTS CONTROL (ILCB)	1	FESC/112AB, 211CB	33-17-04
ILCB CARD 1A29	1	FESC/112AB, 211CB	33-17-04
CABLE ASSEMBLY, PARKING BRAKE	1	FESC/112AB, 211CB	32-48-03
CARTRIDGE, BRAKE SUPPLY MODULE	2	HSC/147AB	32-43-07
CONTROL LEVER, LANDING GEAR	1	FLT STA/P3	32-31-14
SWITCH, PARKING BRAKE HYDRAULIC	1	HSC/147AB	32-48-04
SWITCH, PARKING BRAKE MECHANICAL	1	FESC/112AB, 211CB	32-48-02
VALVE, DUAL POWER BRAKE	2	HSC/147AB	32-43-04
VALVE, BRAKE SHUTTLE	8	REAR SPAR/541AB, 641AB	32-43-03
VALVE, PARKING BRAKE RETURN SHUTOFF	2	HSC/147AB	32-44-03

M1-0000-32-082

Component Location Index
Figure 101

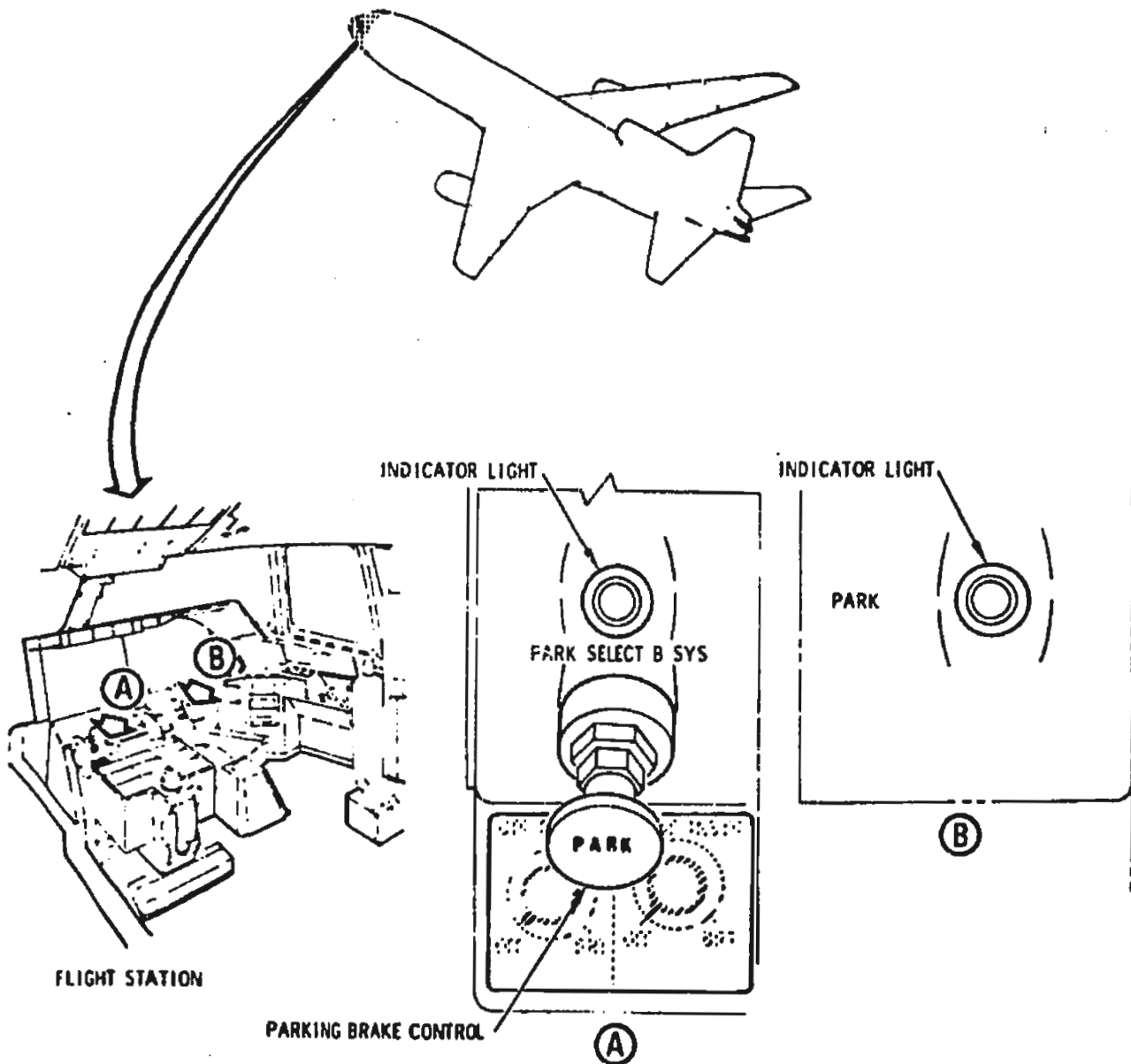
EFFECTIVITY: ALL

32-48-00

Page 103
Mar 15/81

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LOCKHEED
MAINTENANCE MANUAL



M1-0000-32-078

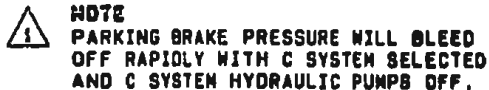
Parking Brake System Component Locator
Figure 102

32-48-00
Page 104
Mar 15/81

EFFECTIVITY: ALL

R
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001B

ELECTRICAL POWER (MM24-00-00)
HYDRAULIC POWER B AND C SYSTEMS (MM29-11-00)
ANTI-SKID SELECTED OFF
CB'S: 2010, 2022.



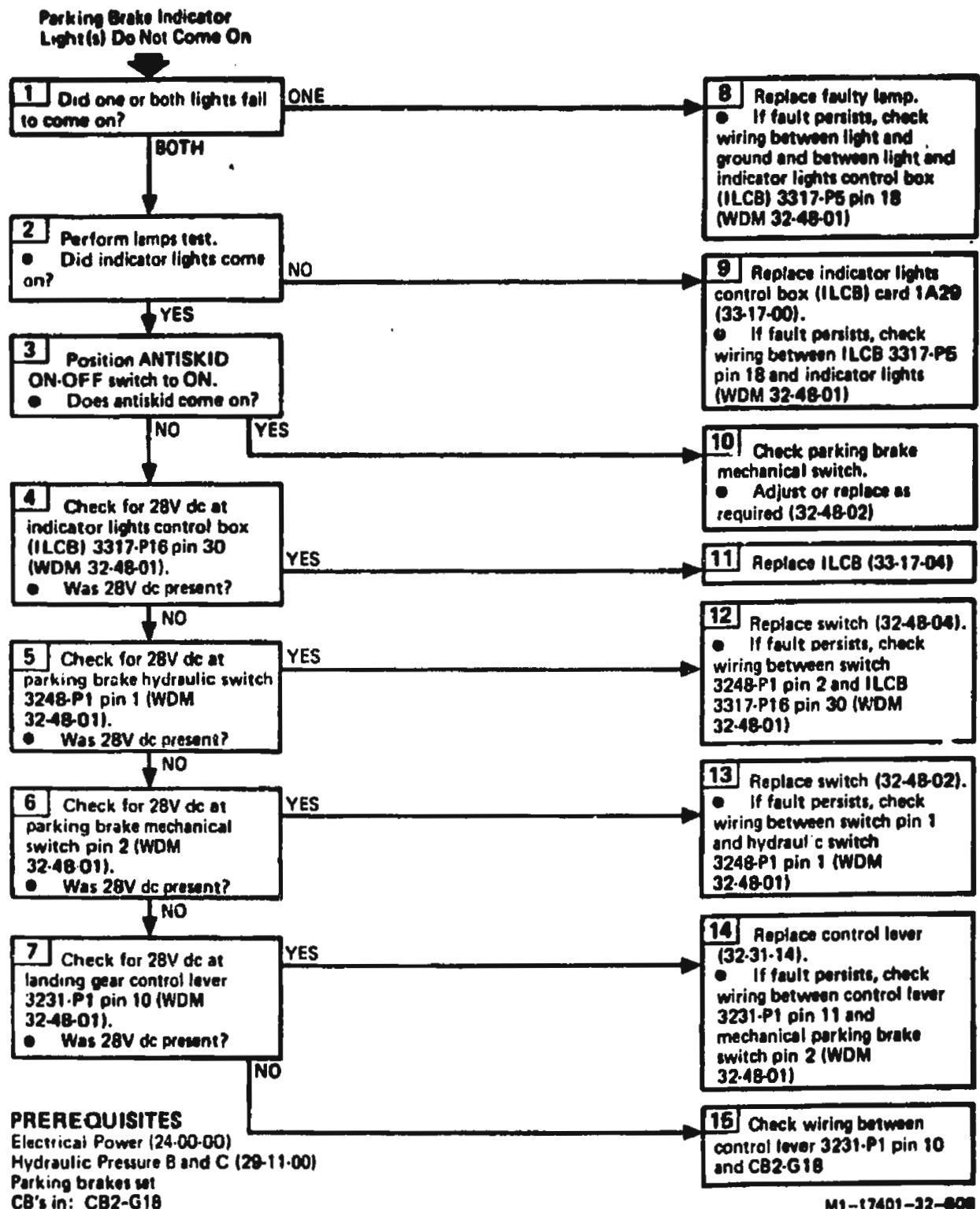
RR

EFFECTIVITY: ALL

32-48-00
Page 105
Nov 15/88

001B

LOCKHEED
MAINTENANCE MANUAL



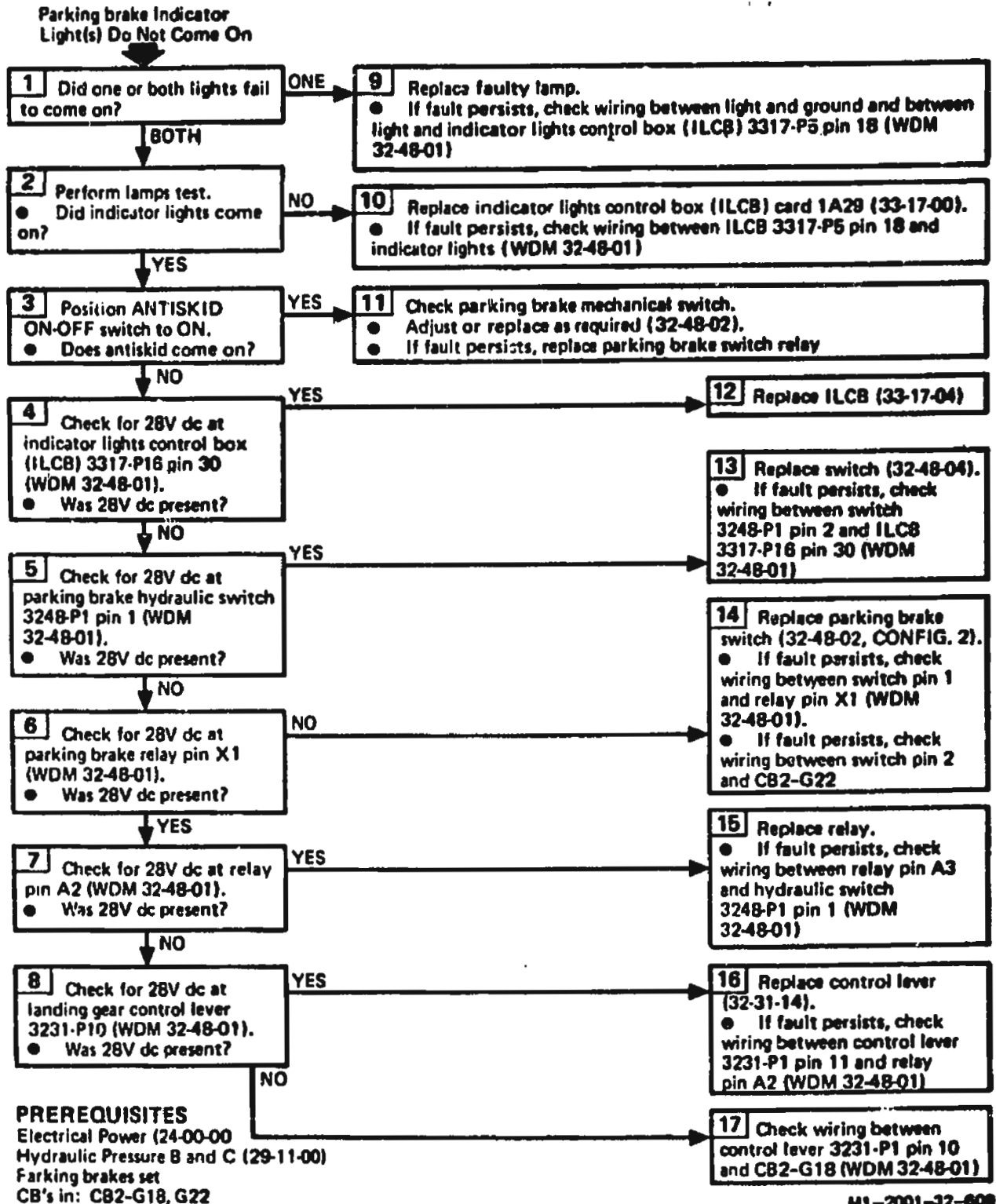
Parking Brake Indicator Lights Do Not Come On
Figure 104

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EFFECTIVITY: 001-014

32-48-00
Page 106
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL



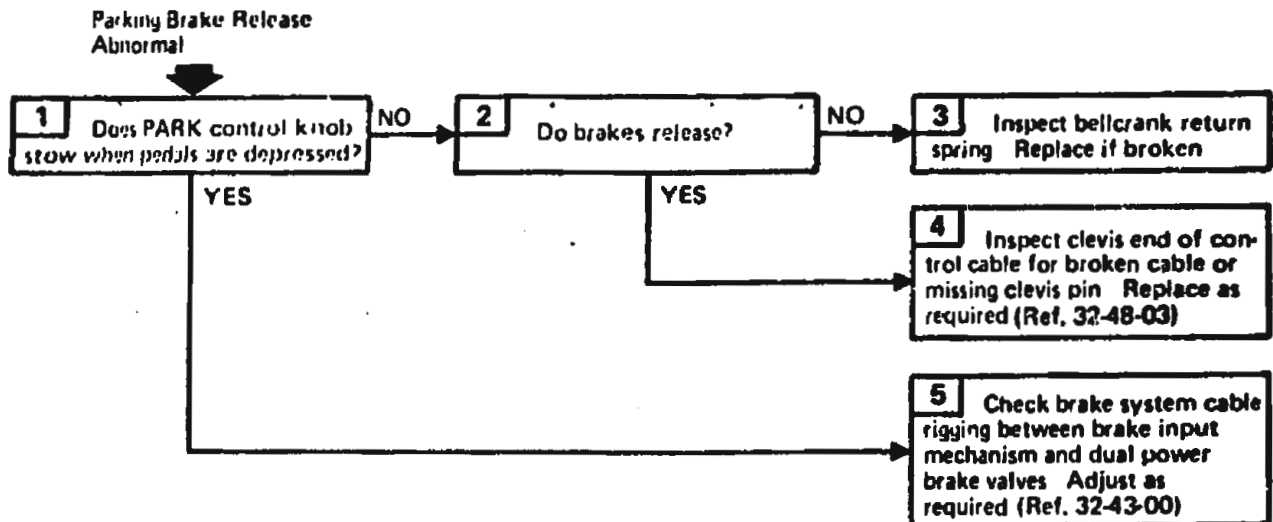
Parking Brake Indicator Lights Do Not Come On
Figure 104

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001B

EFFECTIVITY: 015-999

32-48-00
Page 107
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL



PREREQUISITES
Brake System Operational

M1-17401-32-631

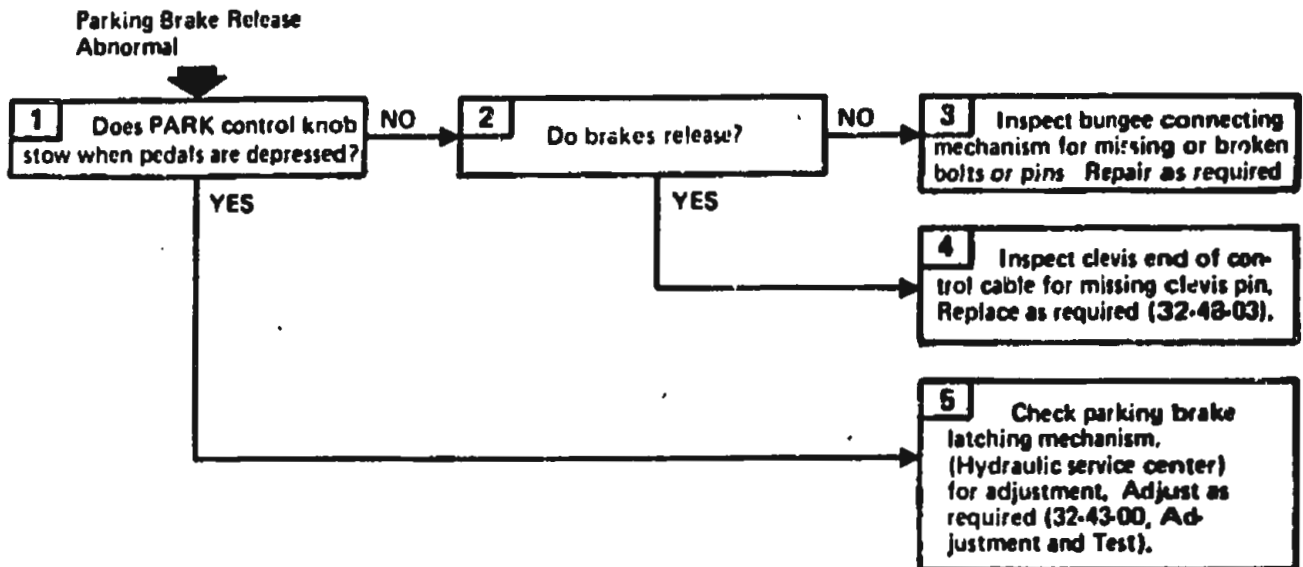
Parking Brake Release Abnormal
Figure 105

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001B

EFFECTIVITY: 001-014

32-48-00
Page 108
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL



PREREQUISITES
Brake System Operational

M1-2001-32-630

Parking Brake Release Abnormal
Figure 105

R
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001B

EFFECTIVITY: 015-999

32-48-00
Page 109
Nov 15/82

LOCKHEED



MAINTENANCE MANUAL

Parking Brake will not set



- | | |
|---|--|
| 1 | Inspect brake input mechanism for proper operation of locking pawl. <ul style="list-style-type: none">• Disconnect Parking Brake Control flexible cable and check for freedom of movement.• Replace/repair as necessary (Ref. 32-48-03) |
|---|--|

PREREQUISITES

Brake system operational

M1-0100-32-867

Parking Brake Will Not Set
Figure 106

R
R

EFFECTIVITY: 001-014

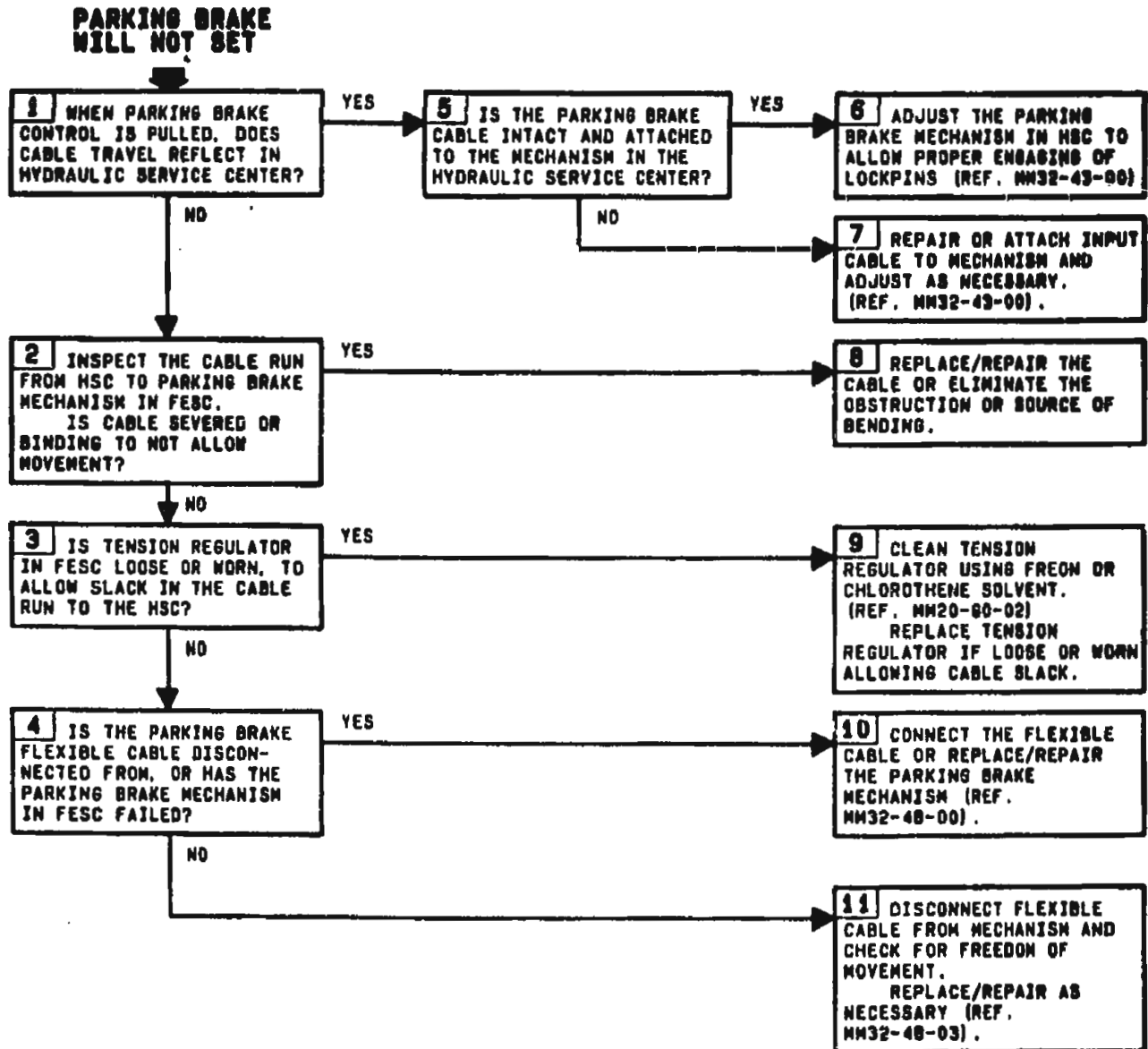
001B

32-48-00

Page 110
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL

PREREQUISITES
BRAKE SYSTEM NOT OPERATIONAL



SI-0000-22-2001

Parking Brake Will Not Set
Figure 106

EFFECTIVITY: 015-999

32-48-00
Page 111
Jul 15/84

001B

R
R

LOCKHEED



MAINTENANCE MANUAL

WITH PARKING BRAKE SET,
"PARK" CONTROL KNOB
RETRACTS TO "OFF"
POSITION



1 INSPECT PARKING BRAKE
LATCH SPRING MECHANISM
FOR BROKEN OR MISSING
COMPONENTS. REPAIR AS
REQUIRED AND ADJUST
(32-43-00, ADJUSTMENT AND
TEST).

PREREQUISITES
BRAKE SYSTEM OPERATIONAL

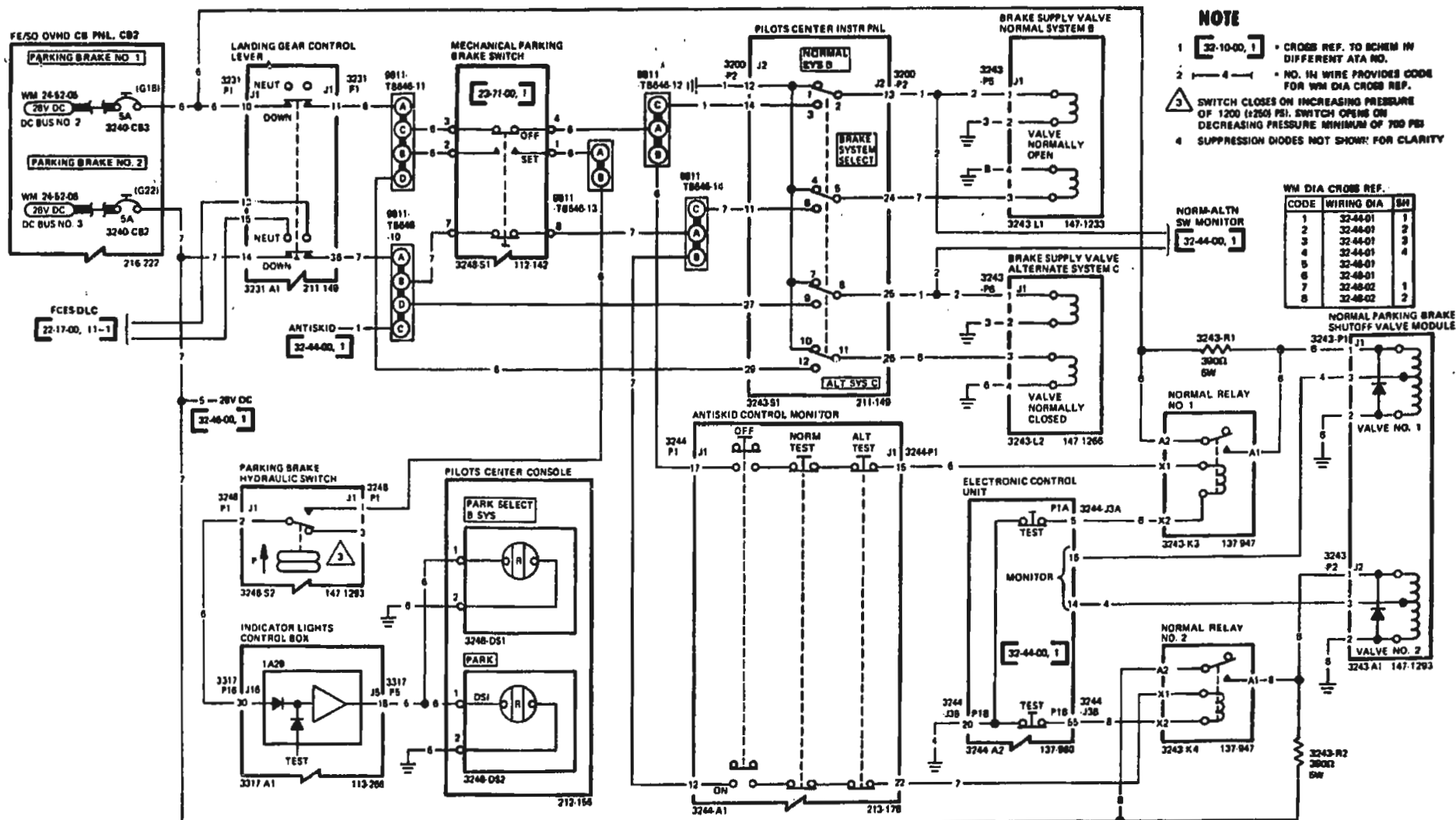
M1-0000-32-262

With Parking Brake Set, Park Knob Retracts to Off Position
Figure 107

R EFFECTIVITY: ALL
R
001B

32-48-00
Page 112
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL

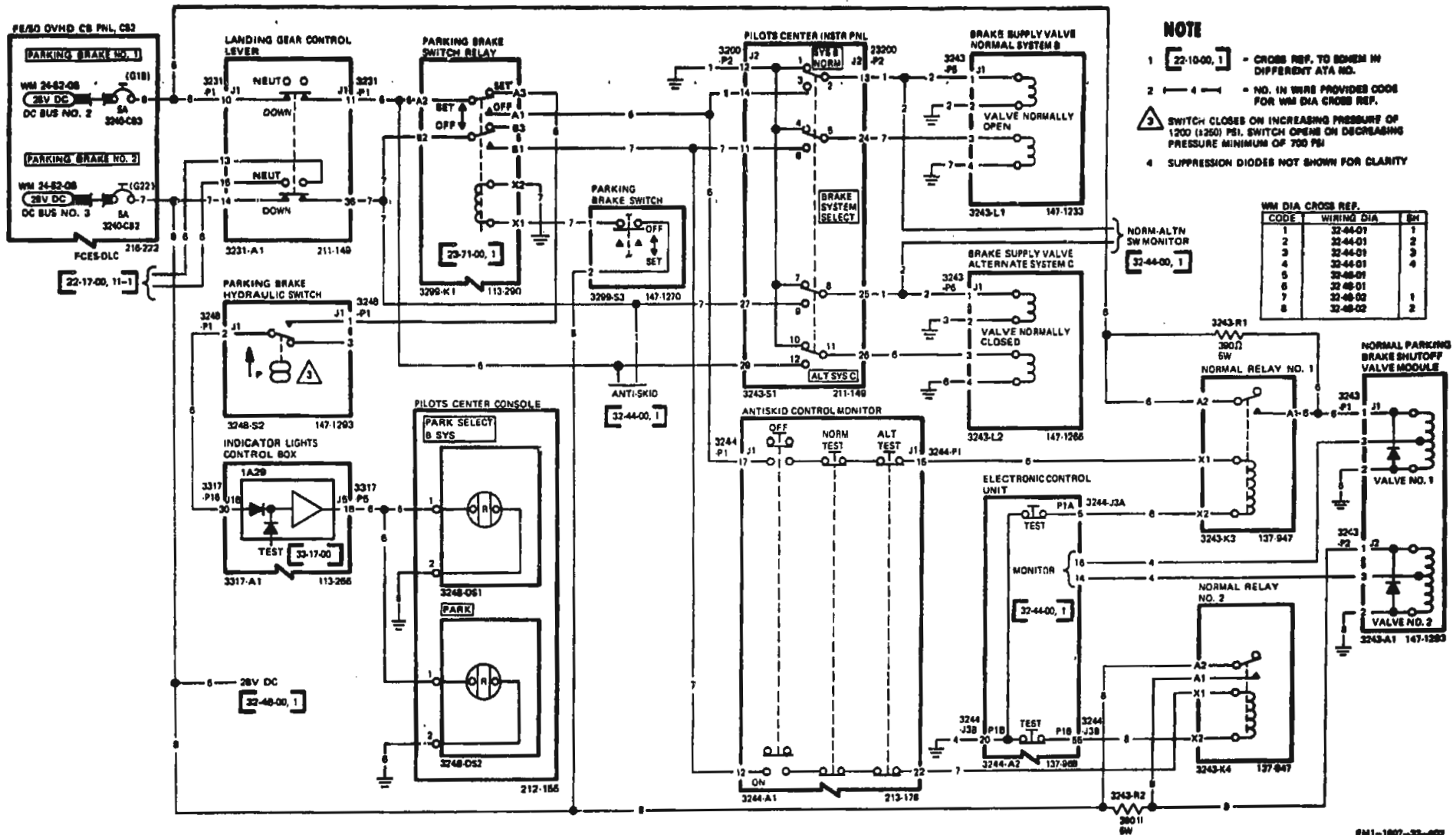


EN1-63608-32-018

Parking Brake System Electrical Schematic
SCHEM 1

32-48-00
Page 113/114
Nov 15/82

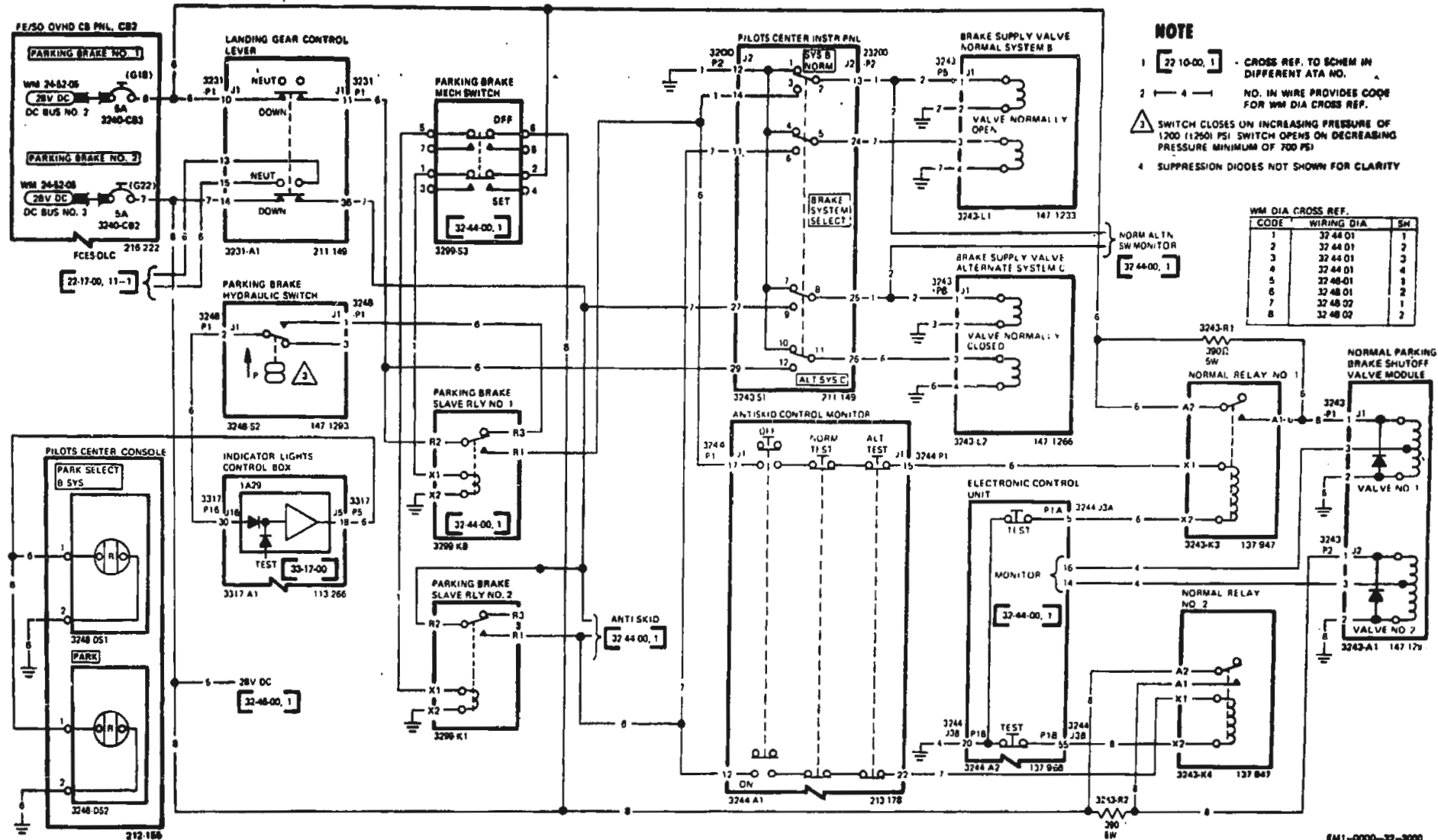
EFFECTIVITY: 001-014
R
001B



Parking Brake System Electrical Schematic
SCHEM 1

EFFECTIVITY: 015-031

32-48-00
Page 115/116
Nov 15/84



Parking Brake System Electrical Schematic
SCHEM 1

EFFECTIVITY: 032-999

32-48-00
Page 117/118
Nov 15/84

LOCKHEED
MAINTENANCE MANUAL

PARKING BRAKE SYSTEM - ADJUSTMENT AND TEST

R 1. Adjustment/Test

The parking brake system is closely related to the main landing gear brake system, where adjustment and test procedures are concerned. For adjustment and test of the parking brake system (Ref. 32-43-00).

2. Referenced Procedure

32-43-00 Main Landing Gear Brake System - Adjustment and Test

EFFECTIVITY: ALL

32-48-00
Page 501/502
Sep 15/73

001B

LOCKHEED
MAINTENANCE MANUAL

PARKING BRAKE MECHANICAL SWITCH - REMOVAL AND INSTALLATION

1. General

The parking brake mechanical switch is mounted on a handle which is secured to a brake input mechanism assembly bracket. The switch is removed from the bracket by removing the handle to which it is secured. There is no adjustment after installation.

2. Referenced Procedures

- 24-00-00 Electrical Power - Maintenance Practices
- 29-11-00 Hydraulic Power System - Maintenance Practices
- 32-43-00 Main Landing Gear Brake System - Adjustment and Test

3. Removal/Installation

A. Removal

- (1) On Flight Engineer/Second Officers circuit breaker panel CB2, open and tag circuit breakers PARKING BRAKE NO. 1 (G18) and PARKING BRAKE NO. 2 (G22).
- (2) On pilots overhead circuit breaker panel CB1, open and tag circuit breaker VOICE RECORD (D1).
- (3) In forward electronics service center, zone 112, remove screw securing switch handle to brake input mechanism assembly bracket (Ref. Fig. 401).
- (4) Slide handle and switch off of bracket.
- (5) At right side and F.S. 180 locate terminal module 9811-TB646. Remove wires (Ref. Table 401).

Wire and Pin Identification
Table 401

	WIRE NUMBER	TERMINAL ROW	MODULE PIN NUMBER	SWITCH PIN NUMBER
R	3248-2A22	13	A	1
R	3248-1A22	11	B	2

EFFECTIVITY: 001-014

32-48-02
CONFIG-1
Page 401
Feb 15/76

LOCKHEED
MAINTENANCE MANUAL

Wire and Pin Identification (Cont)
Table 401

WIRE NUMBER	TERMINAL ROW	MODULE PIN NUMBER	SWITCH PIN NUMBER
3243-10021B18	11	C	3
3243-8A18	12	A	4
3243-20Q25A18	10	B	7
3243-9A18	14	A	8
2371-38A22	16	A	9
2371-11B22	15	A	10

- (6) Remove clamps and ties securing wires.
- (7) Remove switch from handle.

NOTE: When a replacement switch is to be installed, the wires must be disconnected from the removed switch and connected to the replacement switch. Numbered wires must be connected to the same switch pin numbers from which they were disconnected.

B. Installation

R
R
R
R

- (1) Ensure that numbered wires are connected to the correct switch pin numbers, then install switch on handle with actuator roller hinge point at upper end of handle (Ref. Fig. 401).
- (2) Verify that circuit breakers opened in Steps A(1) and A(2) are open.
- (3) Slide switch and handle onto bracket.
- (4) Install screw securing switch handle to bracket. Ensure that handle is positioned against stop, then tighten screw.
- (5) Connect wires to terminal module 9811-TB646 (Ref. Table 401). Secure wires as required.
- (6) Remove tags and close circuit breakers opened in Steps A(1) and A(2).

EFFECTIVITY: 001-014

32-48-02
CONFIG-1
Page 402
Nov 15/75

LOCKHEED



MAINTENANCE MANUAL

(7) Turn on electrical power (Ref. 24-00-00).

R

(8) Turn on hydraulic system B pressure (Ref. 29-11-00).

(9) Depress Captains brake pedals, pull out PARK knob, and release brake pedals. Left and right PARK lights should come on.

(10) If PARK lights do not come on, perform brake system adjustment and test (Ref. 32-43-00).

EFFECTIVITY: 001-014

001B

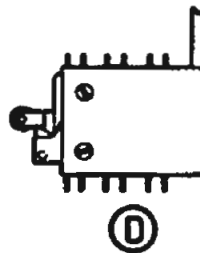
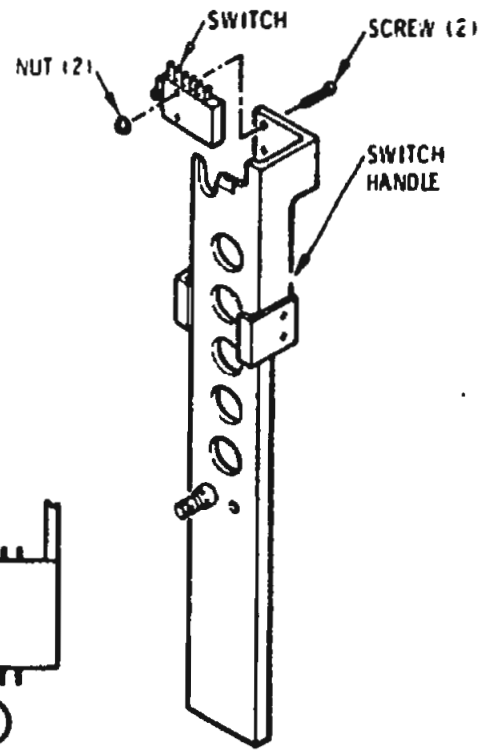
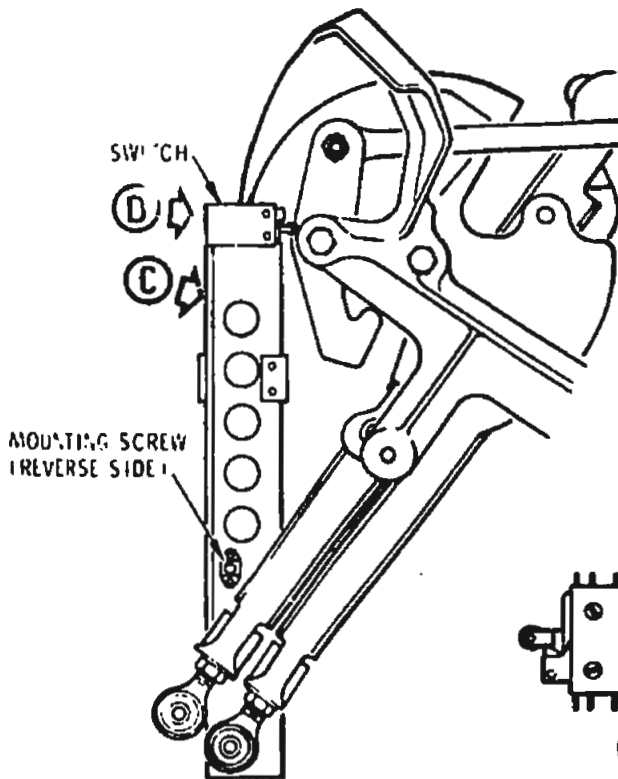
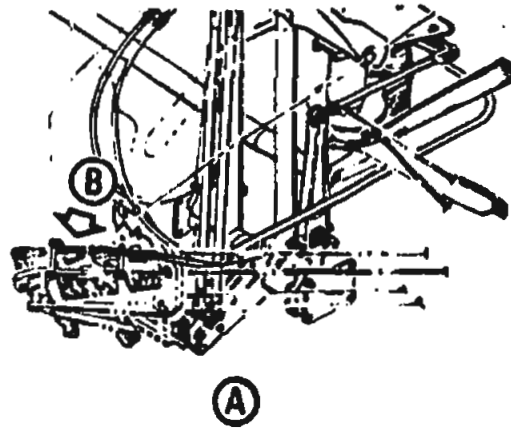
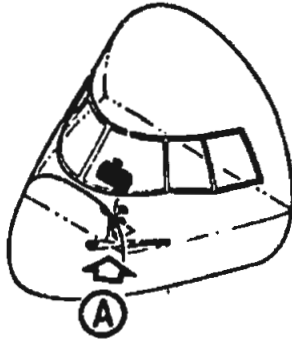
32-48-02

CONFIG-1

Page 403

Nov 15/81

LOCKHEED
MAINTENANCE MANUAL



M1-0102-32-307

R
R

Parking Brake Mechanical Switch - Removal and Installation
Figure 401

EFFECTIVITY: 001-014

32-48-02
CONFIG-1
Page 404
Nov 15/75

PARKING BRAKE MECHANICAL SWITCH - REMOVAL AND INSTALLATION1. Referenced Procedure

32-48-02 Parking Brake Mechanical Switch - Adjustment and Test

2. Removal/Installation

A. Removal

- R
R
- (1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, open and tag PARKING BRAKE NO. 2 (G22) circuit breaker.
 - (2) On aircraft 015-023,
in hydraulic service center, zone 147 between F.S. 1263 and 1283 on same web that switch is mounted, locate terminal module 3299-TB3. Disconnect wire 3299-19A18 from pin A; disconnect wire 3299-18B18 from pin E (Ref. Fig. 401).
 - (2) On aircraft 024-999,
in hydraulic service center, zone 147, between F.S. 1243 and 1263, W.L. 191 and 200, and B.L. 0 and 21L locate terminal module 9811-TB1194. Disconnect wire 3299-19A18 from Row 2 pin A; disconnect wire 3299-18B18 from Row 1 pin A (Ref. Fig. 401).
 - (3) Remove wires from clamps and ties.
 - (4) Remove screws securing switch to adjusting plate.
 - (5) Remove switch.

NOTE: When a replacement switch is to be installed the wires must be disconnected from the removed switch and connected to the replacement switch. Numbered wires must be connected to the same switch pin numbers from which they were disconnected. Wire 3299-19A18 connects to switch pin number 1 and wire 3299-18B18 connects to switch pin number 2.

B. Installation

- (1) Ensure that circuit breaker opened in Step 2A(1) is open and tagged.

EFFECTIVITY: 015-999

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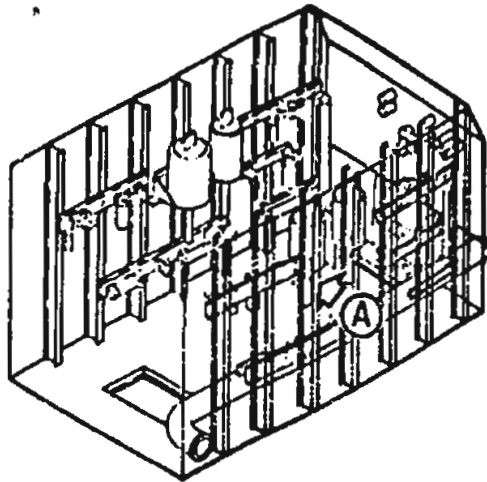
- R (2) Ensure that numbered wires are connected to the correct
R switch pin numbers, then secure switch to adjusting
R plate with screws.
- R (3) Connect wires to terminal module as called out for
R removal in Step A(2).
- (4) Secure wires as required.
- (5) Adjust switch (Ref. 32-48-02).
- (6) Remove tag and close circuit breaker opened in Step
2A(1).

EFFECTIVITY: 015-999

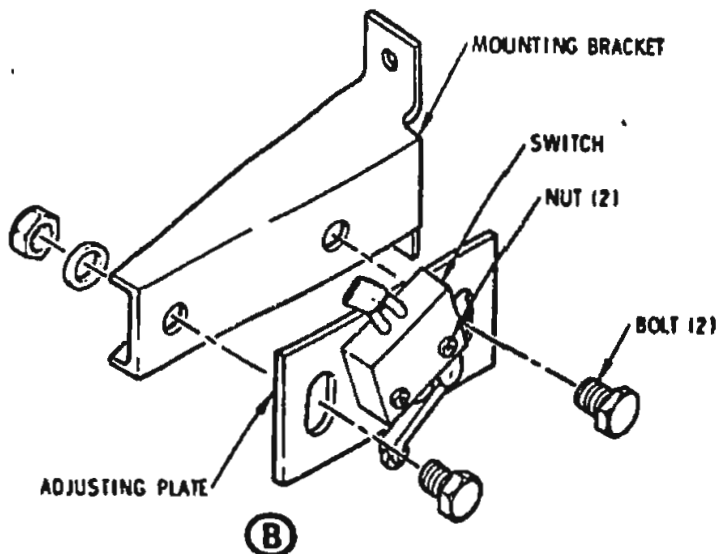
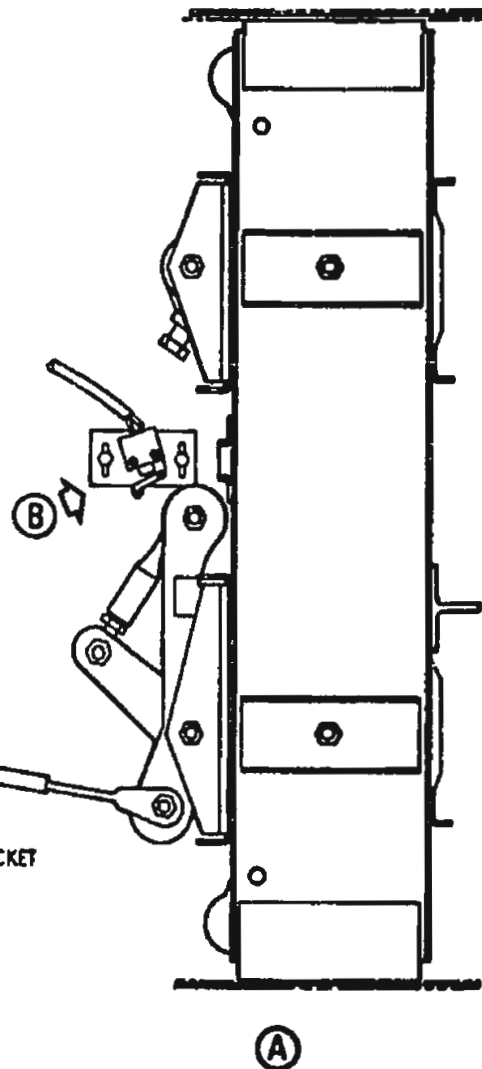
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32-48-02
CONFIG-2
Page 402
Nov 15/74

LOCKHEED
MAINTENANCE MANUAL



HYDRAULIC SERVICE CENTER
ZONE 147



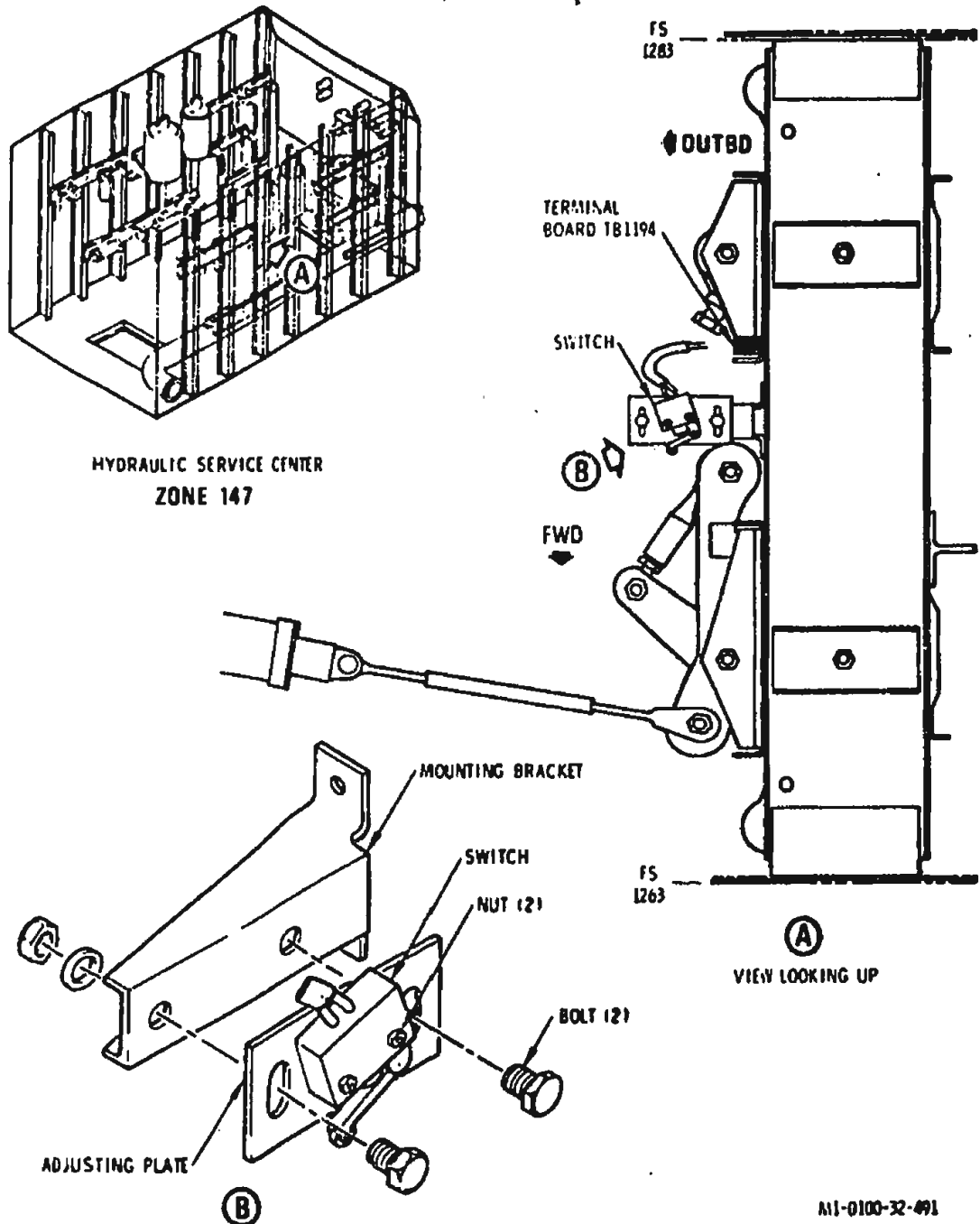
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Parking Brake Mechanical Switch - Removal and Installation
Figure 401

R EFFECTIVITY: 015-023
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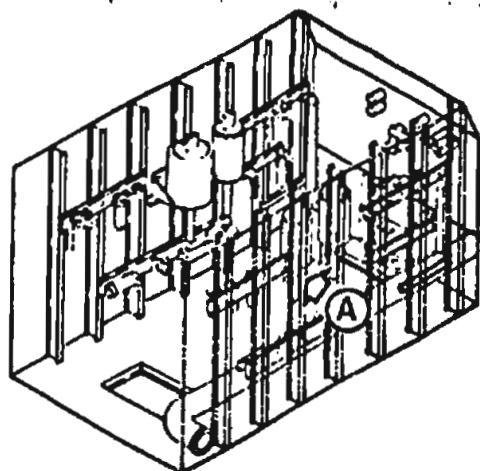
32-48-02
CONFIG-2
Page 403
Nov 15/74

LOCKHEED
MAINTENANCE MANUAL

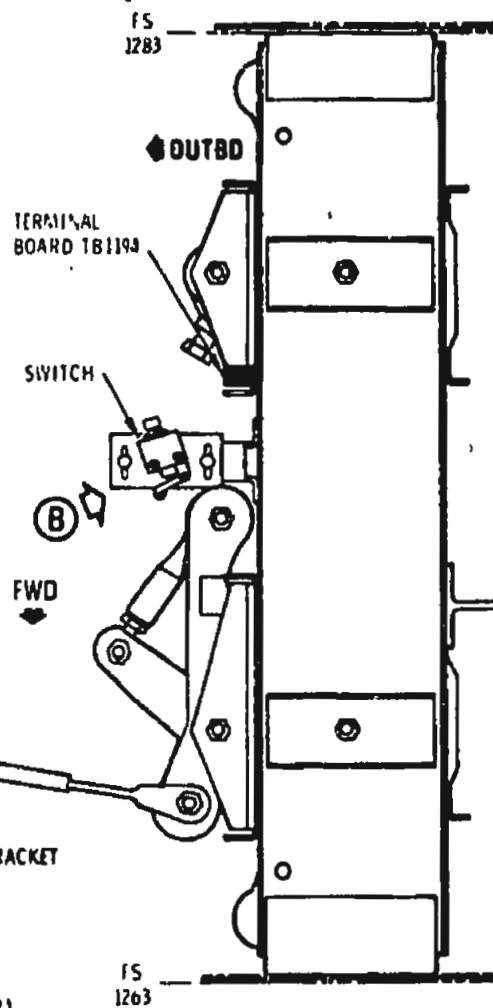
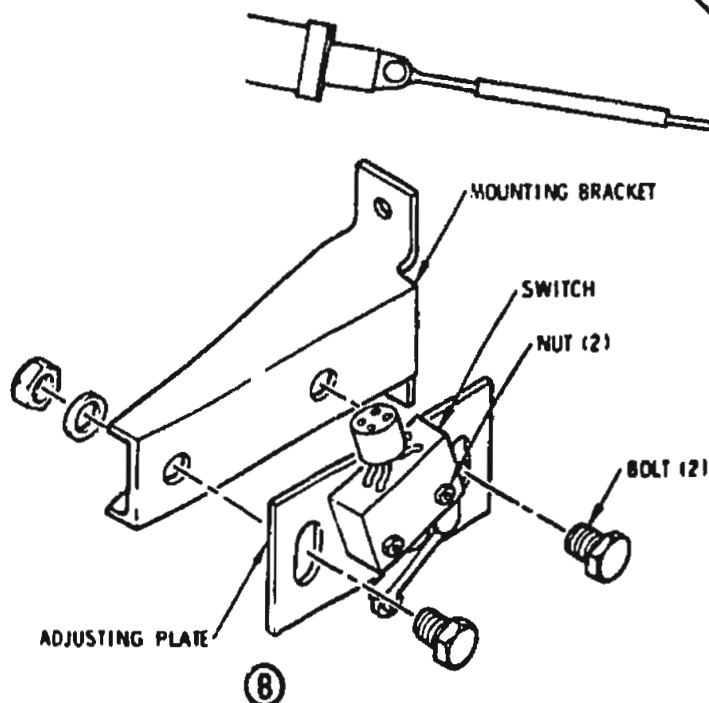


Parking Brake Mechanical Switch - Removal and Installation
Figure 401

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HYDRAULIC SERVICE CENTER
ZONE 147



(A)
VIEW LOOKING UP

MI-0000-32-999

Parking Brake Mechanical Switch - Removal and Installation
Figure 401

EFFECTIVITY: 032-999

32-48-02
CONFIG-2
Page 405/406
Mar 15/81

R
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0028

LOCKHEED
MAINTENANCE MANUAL

R PARKING BRAKE MECHANICAL SWITCH - ADJUSTMENT AND TEST

R 1. General

**R This procedure applies to aircraft 015-999; aircraft 001-014 are
R not equipped with an adjustable switch.**

R 2. Referenced Procedures

R 24-00-00 Electrical Power - Maintenance Practices

R 29-11-00 Hydraulic Power System - Maintenance Practices

R 3. Adjustment/Test

R A. Adjustment

R (1) Turn on electrical power (Ref. 24-00-00).

R (2) Turn on hydraulic system B pressure (Ref. 29-11-00).

**R (3) On pilots center instrument panel, zone 210, place
R BRAKE SYS SELECT switch to NORM SYS B.**

**R (4) On Flight Engineer/Second Officers overhead circuit
R breaker panel CB2, zone 215, ensure that PARKING BRAKE
R NO. 2 (G22) circuit breaker is closed.**

**R (5) Ensure that LANDING GEAR control lever is DOWN
R position.**

**R (6) Depress Captains brake pedals fully on, pull PARK brake
R knob, release pedals, then release PARK brake knob.
R PARK brake knob should remain in pulled-out position
R indicating that parking brakes are on.**

**R (7) In hydraulic service center, zone 147, loosen screws
R securing adjusting plate in position (Ref. Fig. 501).**

**R (8) Position switch so that parking brake lights, on pilots
R center console, come on. Tighten screws.**

**R (9) Depress Captains brake pedals full on and then release
R pedals. PARK brake knob shall retract indicating
R parking brakes are off.**

R (10) Parking brake lights shall go off.

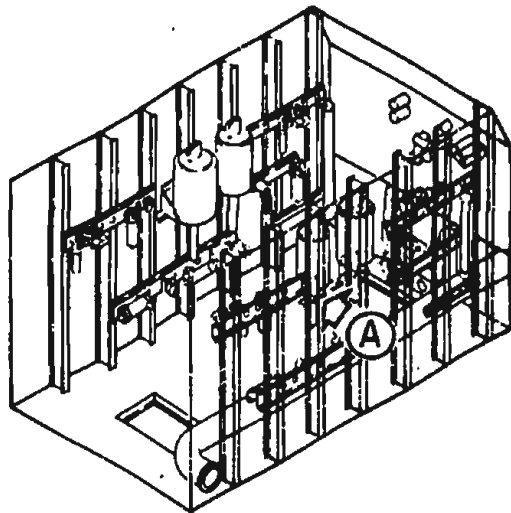
R EFFECTIVITY: 015-999

32-48-02
Page 501
Sep 15/73

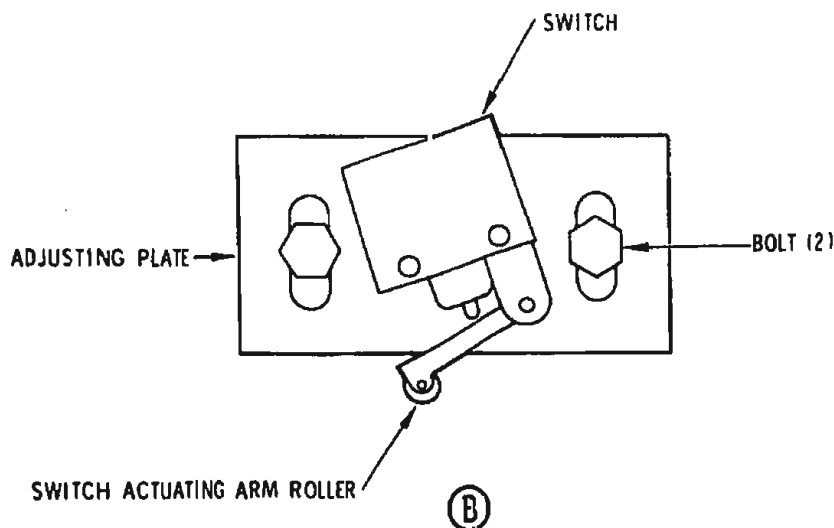
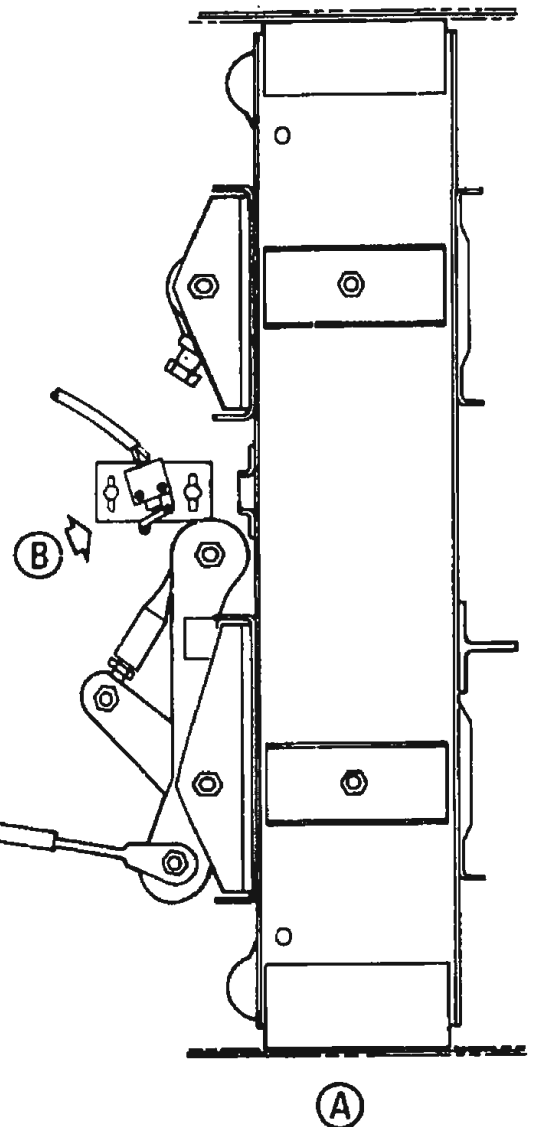
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MAINTENANCE MANUAL

- R (11) Turn off electrical power as required (Ref. 24-00-00).
R (12) Turn off hydraulic system B pressure as required (Ref.
R 24-00-00).

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MAINTENANCE MANUAL



HYDRAULIC SERVICE CENTER
ZONE 147



M1-0100-32-411

Parking Brake Mechanical Switch - Adjustment and Test
Figure 501

EFFECTIVITY: 015-999

32-48-02
Page 503/504
Sep 15/73

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MAINTENANCE MANUAL

PARKING BRAKE CABLE ASSEMBLY - REMOVAL AND INSTALLATION

1. Referenced Procedures

- 25-13-05 Center Console Trim Covers - Removal and Installation
- 32-43-00 Main Landing Gear Brake Rigging - Adjustment and Test
- 53-11-01 Forward Pressure Bulkhead Door - Removal and Installation

2. Removal/Installation

A. Removal

- (1) In flight station, zone 210, remove center console trim covers (Ref. 25-13-05).
- (2) Remove cable knob and two lock nuts (Ref. Fig. 401, VIEW C).
- (3) Remove clamp (VIEW D).
- (4) In forward electronic service center upper, left, forward area; remove clamps (VIEWS E, F, and G).
- (5) Remove left forward pressure bulkhead door (Ref. 53-11-01).
- (6) Working through pressure bulkhead door opening (VIEW B), remove clamps (VIEWS H and J).
- (7) Remove bolt and nut securing cable assembly clevis to pawl (VIEW K).

R CAUTION: REMOVE THE TWO NUTS SECURING CABLE CLAMP TO
R STRUCTURE BEFORE REMOVING CABLE CLAMP BOLTS.

R (8) Remove two nuts securing cable clamp to structure (VIEW
R K).

R (9) Remove two bolts securing cable clamp to cable assembly
R (VIEW K).

R (10) Pull cable downward out of center console and backward
out of forward area. Remove from structure.

EFFECTIVITY: 001-014

32-48-03
CONFIG-1
Page 401
Dec 15/80

LOCKHEED
MAINTENANCE MANUAL

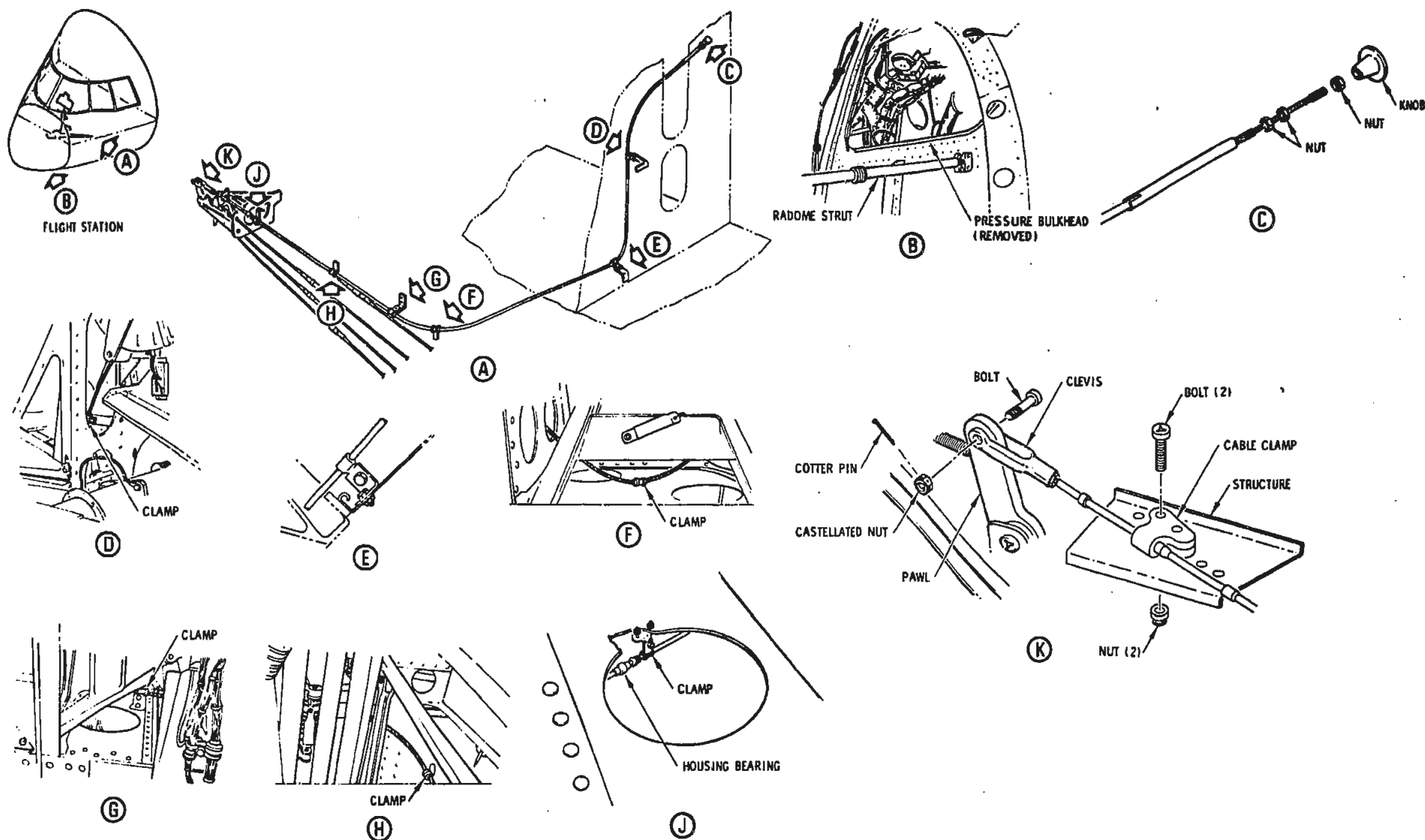
B. Installation

- (1) Route cable around structure adjacent to clamp positions.
- (2) Position cable top end through console and secure with lock nuts. Install knob (VIEW C).
- (3) Secure clevis to pawl with bolt and nut (VIEW K).
- R (4) Secure cable clamp to cable assembly (VIEW K).
- R (5) Secure cable clamp to structure (VIEW K).
- R (6) Secure cable to clamp (VIEW J) ensuring that cable housing bearing is secure in clamp.
- R (7) Secure cable in clamps (VIEWS D, E, F, G, and H).
- R (8) Adjust cable linkage (Ref. 32-43-00).
- R (9) Install center console trim covers (Ref. 25-13-05).
- R (10) Install left forward pressure bulkhead door (Ref. 53-11-01).

EFFECTIVITY: 001-014

001B

32-48-03
CONFIG-1
Page 402
Dec 15/80



M1-0002-32-319

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Parking Brake Cable Assembly - Removal and Installation
Figure 401

EFFECTIVITY: 001-014

32-48-03
CONFIG-1
Page 403/404
Dec 15/80

001B

**PARKING BRAKE CABLE ASSEMBLY - REMOVAL AND INSTALLATION****1. Equipment and Materials**

Lock-wire, Fed Spec QQ-W-390, 0.050-inch diameter, or equivalent

Sealant LCM40-2121, or equivalent

Aliphatic naphtha TT-N-95, or equivalent

Cotter Pin, MS 24665-151, or equivalent

2. Referenced Procedures

25-13-05 Center Console Trim Covers - Removal and Installation

R 32-43-00 Main Landing Gear Brake Rigging - Adjustment and
R Test

3. Removal/Installation of Cable and Tension Regulator**A. Removal****(1) Parking Brake Cable Assembly**

(a) In flight station, zone 210, remove center console trim covers (Ref. 25-13-05).

(b) Remove cable knob and two lock nuts (Ref. Fig. 401, View B).

(c) Remove clamps (Views C and D).

(d) In forward electronic service center upper, left area remove clamps (Views E and F).

R (e) At parking brake forward bungee assembly,
R disconnect spring from cable assembly clevis by
R removing eye-bolt from clevis (View G).

(f) Remove bolt securing clevis to bellcrank.

(g) Remove clamp securing cable assembly to bungee assembly.

(h) Remove clevis from cable assembly and save for installation on replacement cable assembly.

EFFECTIVITY: 015-999

32-48-03
CONFIG-2
Page 401
Nov 15/88

LOCKHEED
MAINTENANCE MANUAL

- (i) Remove cable assembly.
- (2) Tension Regulator
 - (a) Remove bolt and nut at bearing end of tension regulator (Ref. Fig. 401, View A).
 - (b) Remove two bolts securing tension regulator at fairlead.
 - (c) Loosen lock nut and separate cable from tension regulator and remove tension regulator.

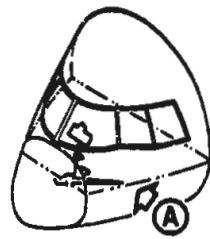
B. Installation

- (1) Tension Regulator
 - (a) Install tension regulator at fairlead and secure with two bolts and washers (Ref. Fig. 401, View A).
 - (b) Attach cable with lock nut to tension regulator and safety with lock-wire.
 - (c) Install bearing end of tension regulator to bungee assembly with bolt and nut and safety with cotter pin.
- (2) Parking Brake Cable Assembly
 - (a) Position cable assembly up through console and adjacent to clamps (Ref. Fig. 401, Views C and D).
 - (b) Install two lock nuts and hand knob on end of cable.
 - (c) Install cable in bungee assembly clamp so that ridge in clamp matches to groove in cable assembly.
 - (d) Install clamps removed in Step 3A(1)(c) and 3A(1)(d).
 - (e) Install clevis on cable assembly rod end.
 - (f) Adjust clevis (Ref. 32-43-00). Safety locknut with lock-wire.
 - (g) Safety clevis bolt nut with cotter pin.
 - (h) Connect spring to cable assembly clevis.

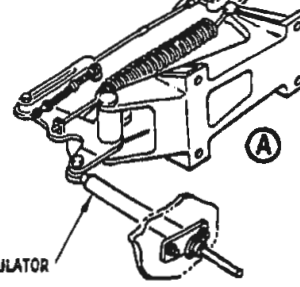
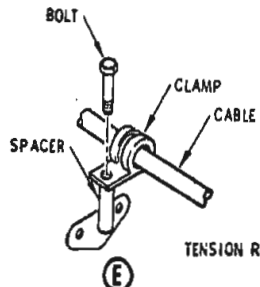
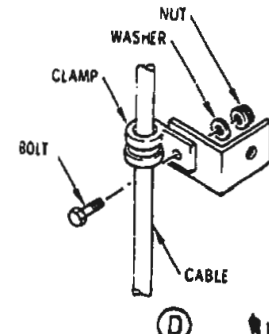
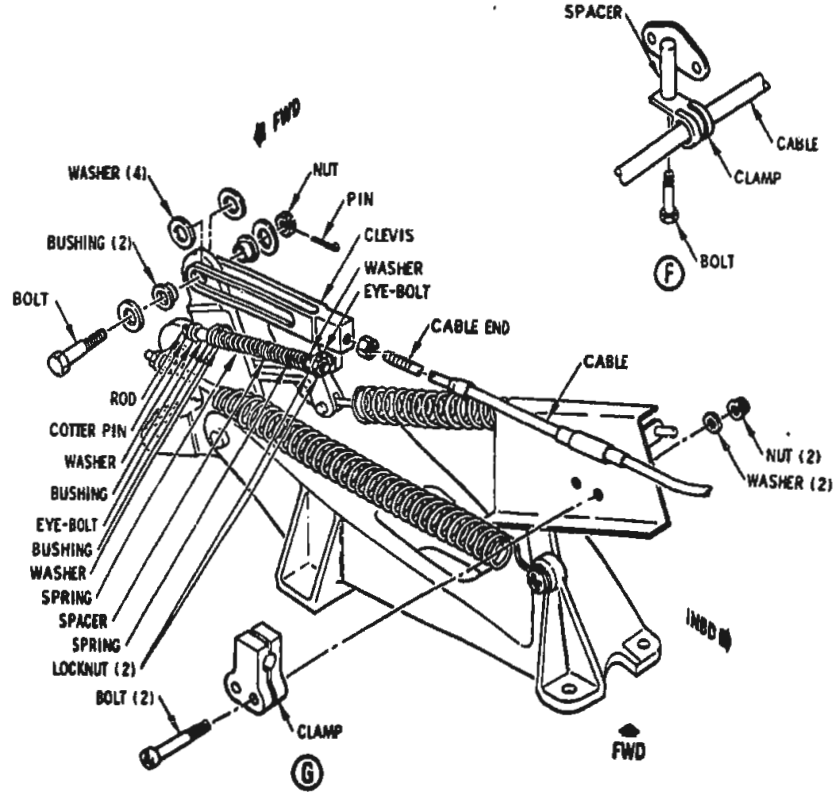
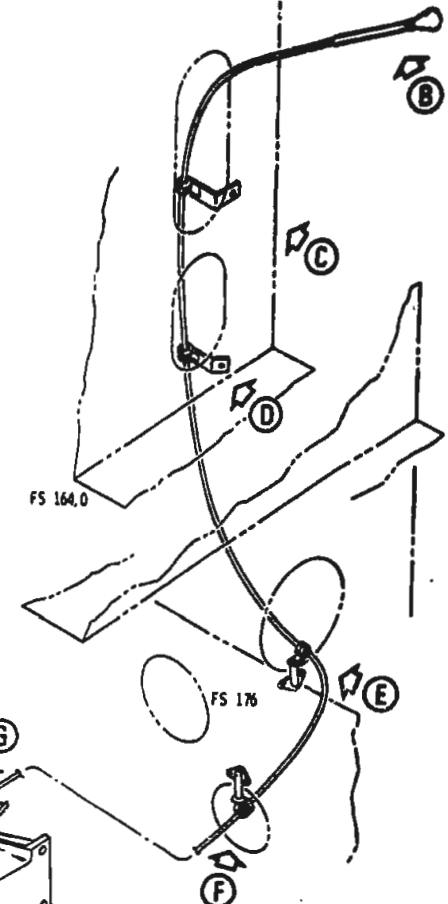
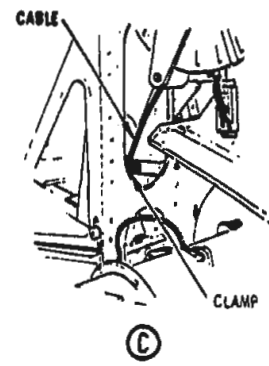
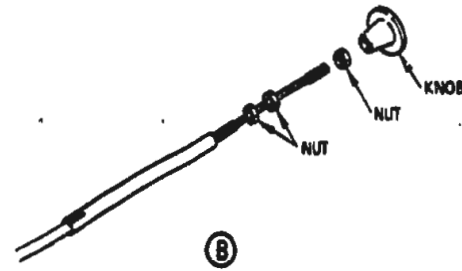
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002B

32-48-03
CONFIG-2
Page 402
Nov 15/87



RIGHT STATION



Parking Brake Cable Assembly - Removal and Installation
Figure 401

M1-0003-32-406

EFFECTIVITY: 015-999

32-48-03
CONFIG-2
Page 403/404
May 15/85

LOCKHEED
MAINTENANCE MANUAL

- (i) Install center console trim covers (Ref. 25-13-05).

4. Removal/Installation of Forward Bungee Assembly

A. Removal

- (1) In forward electronic service center, at forward bungee, remove spring from cable assembly clevis (Ref. Fig. 401 View G).
- (2) Remove cotter pin nut, bolt, washers, and bushings securing clevis to bellcrank.
- (3) Remove clamp securing cable assembly to bungee assembly.
- (4) Remove bolt and nut at bearing end of tension regulator (Ref. View A).
- (5) Remove four bolts, nuts, and washers securing bungee assembly to structure. Remove bungee.

B. Installation

WARNING: PROVIDE ADEQUATE VENTILATION WHEN USING CLEANING SOLVENTS. AVOID BREATHING VAPOURS. AVOID CONTACT WITH SKIN, EYES AND MUCUS MEMBRANES.

- (1) Clean mating surfaces of bungee assembly and structure with aliphatic naphtha TT-N-95, or equivalent. Wipe dry with clean dry cloth before area air dries.
- (2) Apply sealant to mating surfaces of bungee assembly, structure and mounting hardware.
- (3) Position bungee assembly on structure and secure with bolts, nuts and washers.
- (4) Connect bearing end of tension regulator to bungee assembly with nut and bolt (Ref. Fig. 401 View A).
- (5) Install cable in bungee assembly clamp so that ridge in clamp matches groove in cable assembly. Secure clamp to bungee assembly (Ref. View G).
- (6) Attach cable assembly clevis to bungee bellcrank with bushings, washers, bolt, nut and new cotter pin.
- R (7) Adjust cable assembly clevis (Ref. 32-43-00).

EFFECTIVITY: 015-999

LOCKHEED



MAINTENANCE MANUAL

- R (8) Install spring on cable assembly clevis.

EFFECTIVITY: 015-999

002B

32-48-03
CONFIG-2
Page 406
Nov 15/88

LOCKHEED
MAINTENANCE MANUAL

PARKING BRAKE HYDRAULIC SWITCH - REMOVAL AND INSTALLATION

1. Equipment and Materials

Lock-wire, Fed Spec, QQ-W-390, 0.020-inch diameter, or equivalent

Lock-wire, Fed Spec, QQ-W-390, 0.032-inch diameter, or equivalent

Container, two quart capacity

2. Referenced Procedures

24-00-00 Electrical Power - Maintenance Practices

29-11-00 Hydraulic Power System - Maintenance Practices

3. Removal/Installation

A. Removal

- (1) On Flight Engineer/Second Officers circuit breaker panel CB2, open and tag PARKING BRAKE NO. 1 (G18) circuit breaker.
- (2) Ensure that hydraulic system B pressure is 0 psi (Ref. 29-11-00).
- (3) Disconnect electrical connector from parking brake hydraulic switch (Ref. Fig. 401).
- (4) Position container under switch to catch any spilled hydraulic fluid.
- (5) Loosen switch from parking brake shutoff module.
- (6) Remove switch.

B. Installation

- (1) Ensure that circuit breaker opened in Step 3A(1) is open and tagged.
- (2) Inspect switch seal for wear, damage, or distortion. Replace seal as required.
- (3) Install switch and tighten.

R

EFFECTIVITY: ALL

001B

32-48-04
Page 401
Nov 15/81

LOCKHEED
MAINTENANCE MANUAL

- (4) Safety switch with 0.032-inch lock-wire.
- (5) Connect electrical connector to switch.
- (6) Safety electrical connector with 0.020-inch lock-wire.

R

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

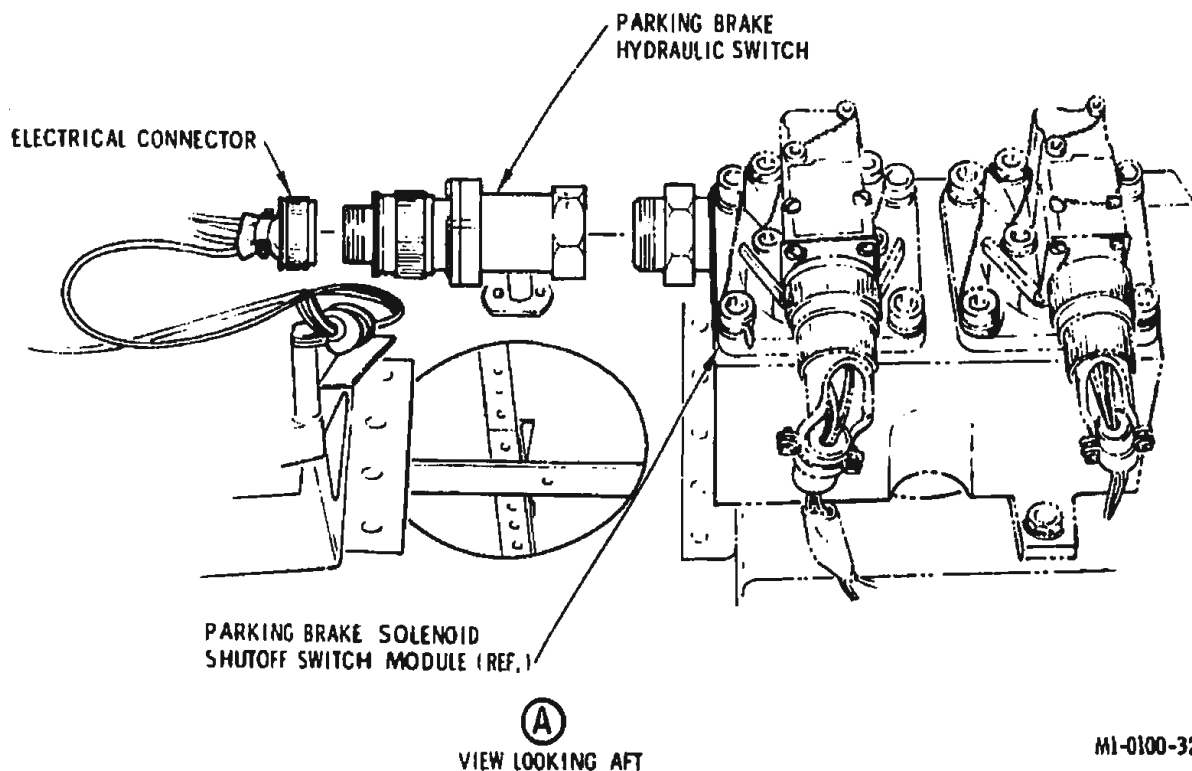
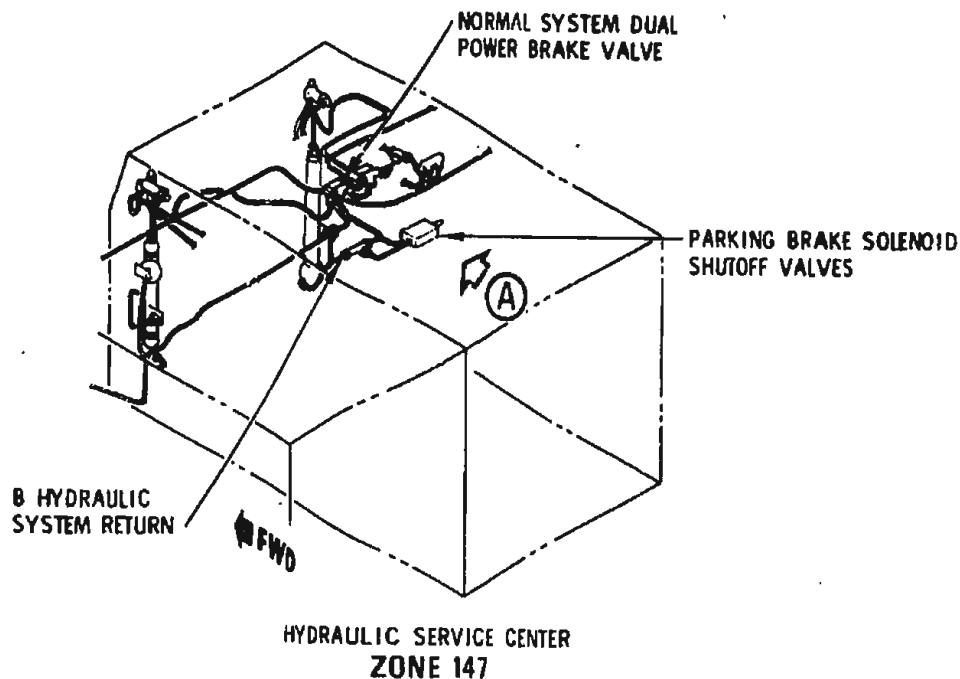
- (7) Turn on hydraulic system B pressure (Ref. 29-11-00).
- (8) Inspect for hydraulic leaks.
- (9) Ensure that LANDING GEAR control lever is in DOWN position.
- (10) On pilots center instrument panel, ensure that BRAKE SYS SELECT switch is in NORM SYS B position.
- (11) Turn on electrical power (Ref. 24-00-00).
- (12) Remove tag and close circuit breaker opened in Step 3A(1).
- (13) In flight station, zone 211, depress Captains brake pedals fully on, pull PARK brake knob, release pedals, then release PARK brake knob. PARK brake knob should remain in pulled-out position, indicating that parking brakes are on. Parking brake lights shall be on.
- (14) Turn off electrical power as required (Ref. 24-00-00).
- (15) Turn off hydraulic system B pressure as required (Ref. 29-11-00).
- (16) Release parking brakes as required.

EFFECTIVITY: ALL

001B

32-48-04
Page 402
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



MI-0100-32-412

Parking Brake Hydraulic Switch - Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-48-04
Page 403/404
Sep 15/73

0018

**R NOSE GEAR STEERING SYSTEM - DESCRIPTION AND OPERATION****R 1. General**

R The nose landing gear steering system (Ref. Fig. 1) is cable
R controlled and hydraulically actuated by hydraulic system C
R pressure. Steering is controlled either by rudder pedal or hand
R wheel operation. Rudder pedal steering is limited to a steering
R angle approximately 10 degrees either side of center. Hand
R wheel steering is limited to approximately 65 degrees either
R side of center. Towing the aircraft with the same deflection
R limit (65 degrees) without disconnecting the steering mechanism
R is permitted. Removing the towing disconnect pin at the torque
R arm apex and disconnecting the on board weight and balance
R conduit connector allows 360 degree swiveling for towing.

R 2. Operation

R Steering inputs from rudder pedals or handwheel are transmitted
R through cables (Ref. Fig. 1) to the power steering valve (Ref.
R Fig. 2). The power steering valve meters hydraulic fluid from
R landing gear down pressure to the steering actuators for power
R steering. When the desired steering angle deflection is
R reached, a differential followup mechanism returns the steering
R valve to neutral and stops hydraulic fluid flow to the
R actuators. After takeoff, when the landing gear has been
R retracted, power steering is no longer active because landing
R gear down pressure is no longer available. Shimmy dampening is
R provided by the steering actuators and valve metering. The
R compensator acts as a reservoir to maintain full actuators and
R steering valve, and will maintain shimmy dampening in case of
R hydraulic system C pressure failure. The nose landing gear
R air/ground safety sensing circuitry (Ref. Fig. 3) acts to
R electrically disconnect rudder pedal steering, when the aircraft
R is airborne. This action enables the pilot to land with a
R deflected rudder, and a centered nose wheel.

R The rudder pedal steering disconnect electrical circuit (Ref.
R Fig. 3) consists of a portion of the air/ground sensing system
R circuit, a hand wheel force displacement switch, a cable drum
R displacement switch, and a rudder pedal disconnect actuator.

R Rudder pedal steering is limited to 10 degrees right or left.
R Steering beyond 10 degrees, and up to 65 degrees, is performed
R using handwheel steering. The rudder pedal steering disconnect
R actuator disengages the rudder pedals to prevent them from
R inhibiting handwheel steering because of travel limits of the
R rudder pedals.

R EFFECTIVITY: ALL

001B

32-51-00

Page 1

Mar 15/84

LOCKHEED
MAINTENANCE MANUAL

R Two switches provide circuit control to perform rudder pedal steering disconnect. The handwheel force displacement switch is located in the steering force sensor (Ref. Fig. 4). The cable drum displacement switch is located on the steering drum assembly (Ref. Fig. 5). The force displacement switch is connected in series with the cable drum displacement switch (Ref. Fig. 3). Electrical power is supplied through the nose gear steering relay when the nose landing gear is on the ground. During rudder pedal steering, the force displacement switch and the cable drum displacement switch are closed, the disconnect actuator is energized, and the rudder pedals are mechanically linked to the nose landing gear steering system. During handwheel steering, the force displacement switch or the cable drum displacement switch, or both, is open. The disconnect actuator is deenergized, the linkage is disengaged, and nose landing gear handwheel steering is available. The force displacement switch opens when torque is applied to the handwheel and rotation has been accomplished in excess of 2 degrees. This capability allows handwheel steering through the full range, up to 65 degrees.

3. Power Steering Valve System

A. Description and Operation

The power steering valve system consists of the following three major subassemblies: two trunnion valves connected to the valve assembly by interconnecting tubes, a valve assembly, and a compensator assembly (Ref. Fig. 6). The trunnion valves can be removed as separate units. The valve assembly and compensator assembly can be removed as a combined unit.

The power steering valve system (Ref. Fig. 2) is controlled by a cable system connected through an input link to the input arm of the valve assembly. The main valve ports are opened or closed by rotating the input arm. The valve is used to control the flow of fluid to the trunnion valves. The trunnion valves control the flow of fluid to the steering actuators. Anticavitation valves, operating in conjunction with the compensator assembly, prevent shimmy of the nosewheel.

4. Steering Actuator

A. Description

The NLG steering actuator (Ref. Fig. 7) provides steering and shimmy dampening of the NLG wheel during ground

EFFECTIVITY: ALL

001B

32-51-00
Page 2
Jul 15/84



operation. The actuator consists of a piston rod, a piston head, a trunnion, a tube, and a cylinder.

The piston rod is supported at one end by the piston head and at the other end by a bearing held in an adapter. Integrally machined piston head lands fit against the cylinder to form two fluid cavities. Each cavity opens to a port in the cylinder. Packings, backup rings, and a seal are installed between the lands to prevent internal leakage between the cavities. An internal nut retains the piston rod, the piston head, the bearing, and the adapter in the cylinder. Packing, backup rings, and seals are provided to prevent external leakage.

The trunnion which is installed on the cylinder, provides the fluid connections to the actuator. An external nut and washer retain the trunnion on the cylinder. Packings and backup rings are installed between the trunnion and cylinder to prevent external leakage.

The tube, which is installed between the trunnion and the cylinder, routes pressurized fluid to the extension side of the piston and return fluid from the retract side of the piston.

B. Operation

When pressure is applied to the retract port, hydraulic fluid causes the piston rod to retract. When the piston rod retracts, fluid between the piston head and cylinder is forced out through the extend port.

When pressure is applied to the extend port, hydraulic fluid causes the piston rod to extend. When the piston rod extends, fluid between the piston head and cylinder is forced out through the retract port.

5. Rudder Pedal Disconnect Actuator

A. Description

R The rudder pedal disconnect actuator (Ref. Fig. 8) provides the means to disconnect the rudder pedal nose gear steering during handwheel operation or when the aircraft is airborne. The actuator is installed on the front of the rudder pedal steering mechanism assembly below the flight station floor, zone 112.

R On aircraft without SB32-137,
R the internal circuitry (Ref. Fig. 3) consists of a limit switch, two motor field coils, a magnetic clutch, a brake

EFFECTIVITY: ALL

32-51-00
Page 3
May 15/88



coil, and a rectifier bridge to supply direct current to power the magnetic clutch.

R On aircraft with SB32-137,
R the internal circuitry (Ref. Fig. 3) consists of two coil
R windings and a capacitor.

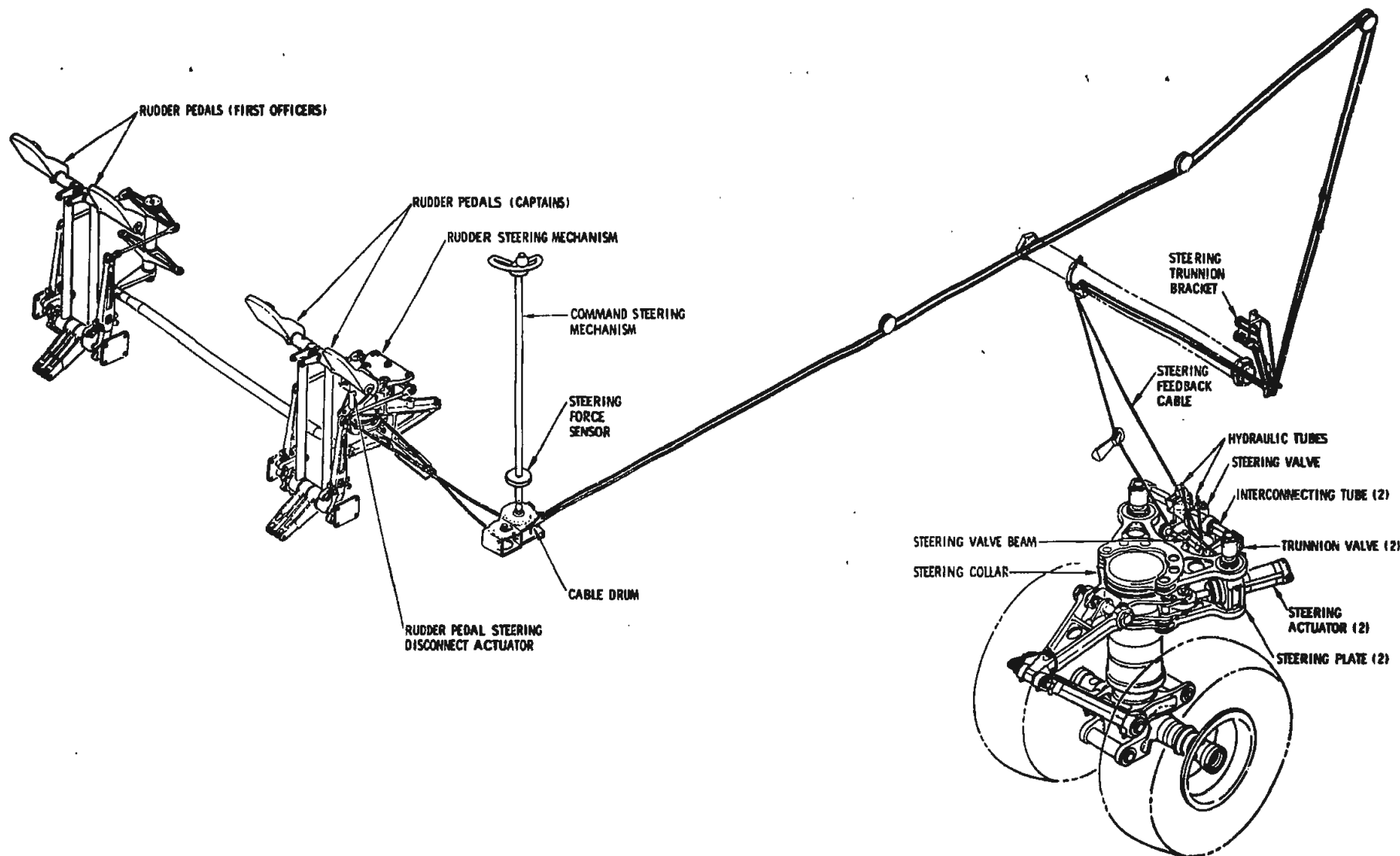
B. Operation

R On aircraft without SB32-137,
R during rudder pedal steering, the handwheel force
displacement switch and cable drum displacement switch are
closed (Ref. Fig. 3), and electrical power is applied to the
actuator. The clutch is energized and engaged, and the
motor fields are energized. The brake, which is normally
engaged with power off, is energized and releases. The
motor powers the actuator gear train and drive screw (Ref.
Fig. 8), causing the actuator arm to engage the cable drum
and connect the rudder pedals to nose landing gear steering.
When the actuator reaches the engaged position, the limit
switch (Ref. Fig. 3) is opened and deenergizes the motor and
brake. Motor torque stops, and the brake is engaged. The
clutch remains energized and engaged.

R On aircraft with SB32-137,
R when aircraft power is applied to the motor field windings,
R the motor powers the actuator gear train and drive screw
R (Ref. Fig. 8), causing the actuator arm to engage the cable
R drum and connect the rudder pedals to nose landing gear
R steering. When the actuator reaches the engaged position,
R the motor remains powered in the stalled condition.

R On aircraft without SB32-137,
R during handwheel steering, either the handwheel force
displacement switch or the cable drum displacement switch
opens the power circuit to the actuator. The clutch is
deenergized and disengaged, allowing the actuator disengage
spring to disconnect the actuator arm from the cable drum,
and disconnect the rudder pedals from nose landing gear
steering (Ref. Fig. 8). The limit switch closes, the motor
and brake are deenergized and the clutch is released.

R On aircraft with SB32-137,
R when aircraft power is removed from the actuator (nose
R landing gear in the "AIR" mode), the disengage spring drives
R the actuator to the disengaged position disconnecting the
R rudder pedals from the nose landing gear steering system.



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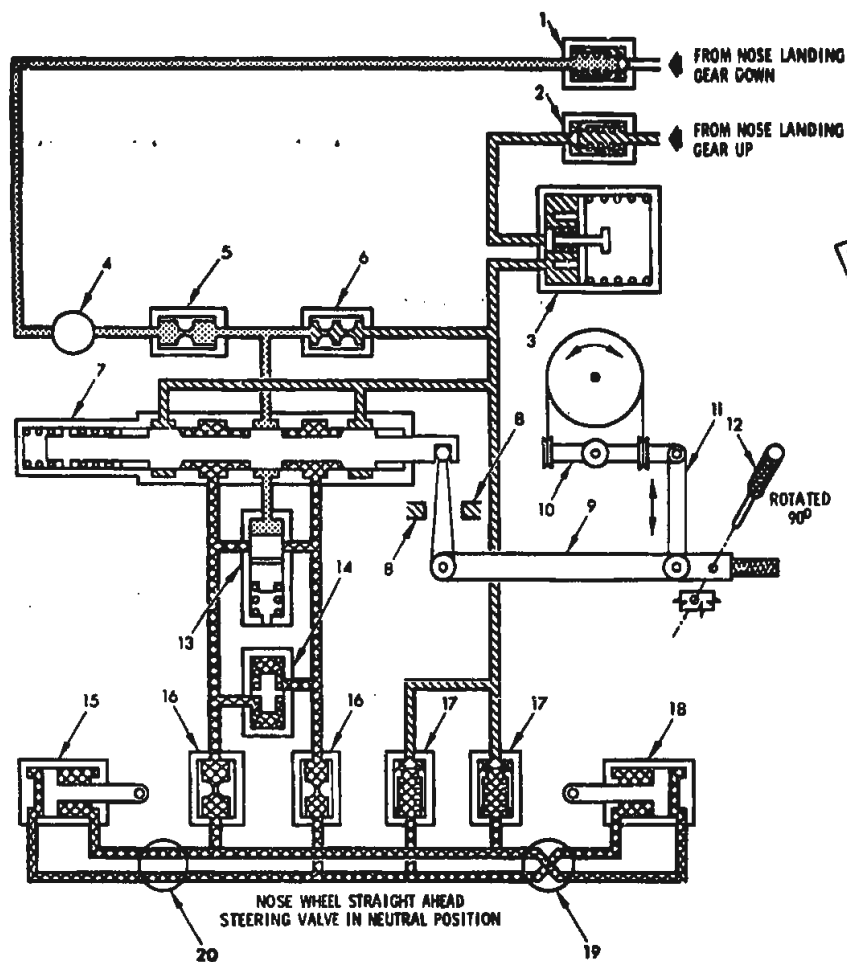
Nose Landing Gear Steering System Component Location
Figure 1

32-51-00
Page 5/6
Mar 15/84

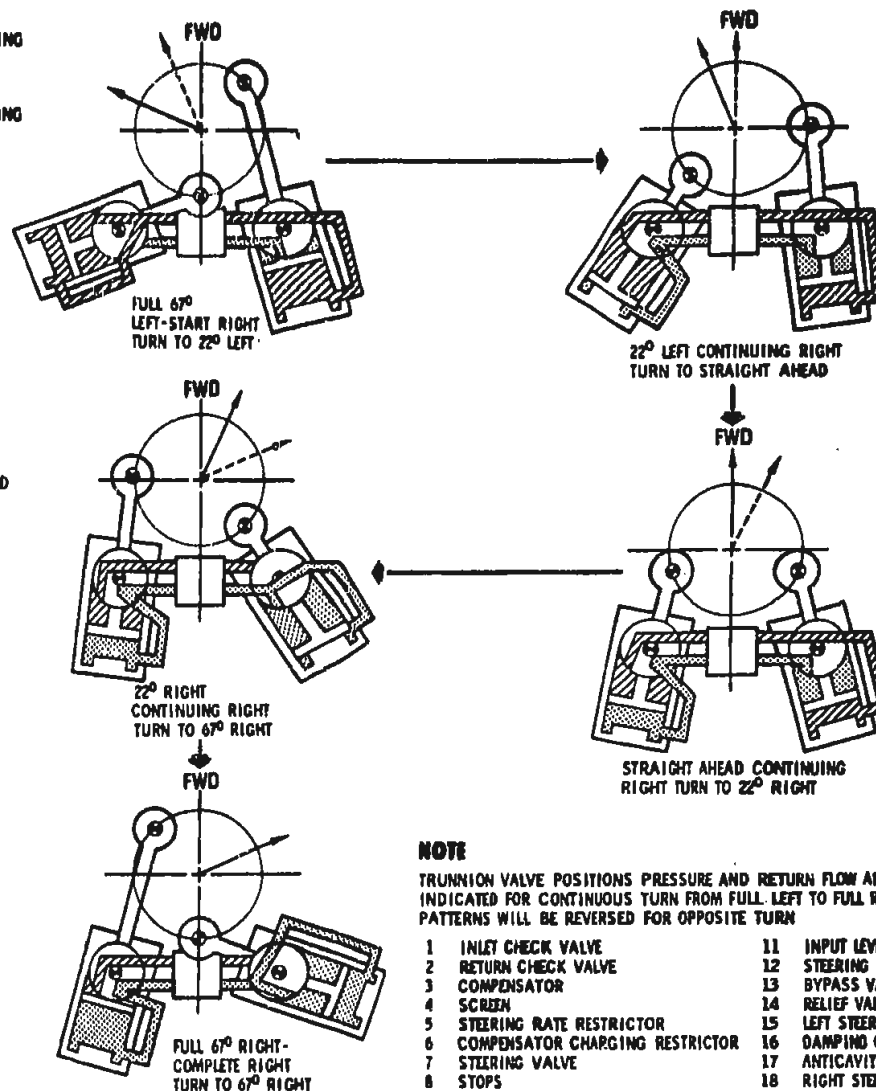
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R EFFECTIVITY: ALL

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CODE
 RETURN
 PRESSURE
 STATIC (STRAIGHT AHEAD)



NOTE

TRUNNION VALVE POSITIONS PRESSURE AND RETURN FLOW ARE INDICATED FOR CONTINUOUS TURN FROM FULL LEFT TO FULL RIGHT. PATTERNS WILL BE REVERSED FOR OPPOSITE TURN

- | | |
|-----------------------------------|----------------------------|
| 1 INLET CHECK VALVE | 11 INPUT LEVER |
| 2 RETURN CHECK VALVE | 12 STEERING LOCKOUT PIN |
| 3 COMPENSATOR | 13 BYPASS VALVE |
| 4 SCREEN | 14 RELIEF VALVE |
| 5 STEERING RATE RESTRICTOR | 15 LEFT STEERING ACTUATOR |
| 6 COMPENSATOR CHARGING RESTRICTOR | 16 DAMPING ORIFICE |
| 7 STEERING VALVE | 17 ANTICAVITATION VALVE |
| 8 STOPS | 18 RIGHT STEERING ACTUATOR |
| 9 GROUND OPERATION LEVER | 19 RIGHT STEERING TRUNNION |
| 10 STEERING VALVE BEAM | 20 LEFT TRUNNION VALVE |

M1-0002-32-028

Nose Landing Gear Steering Hydraulic Schematic
Figure 2

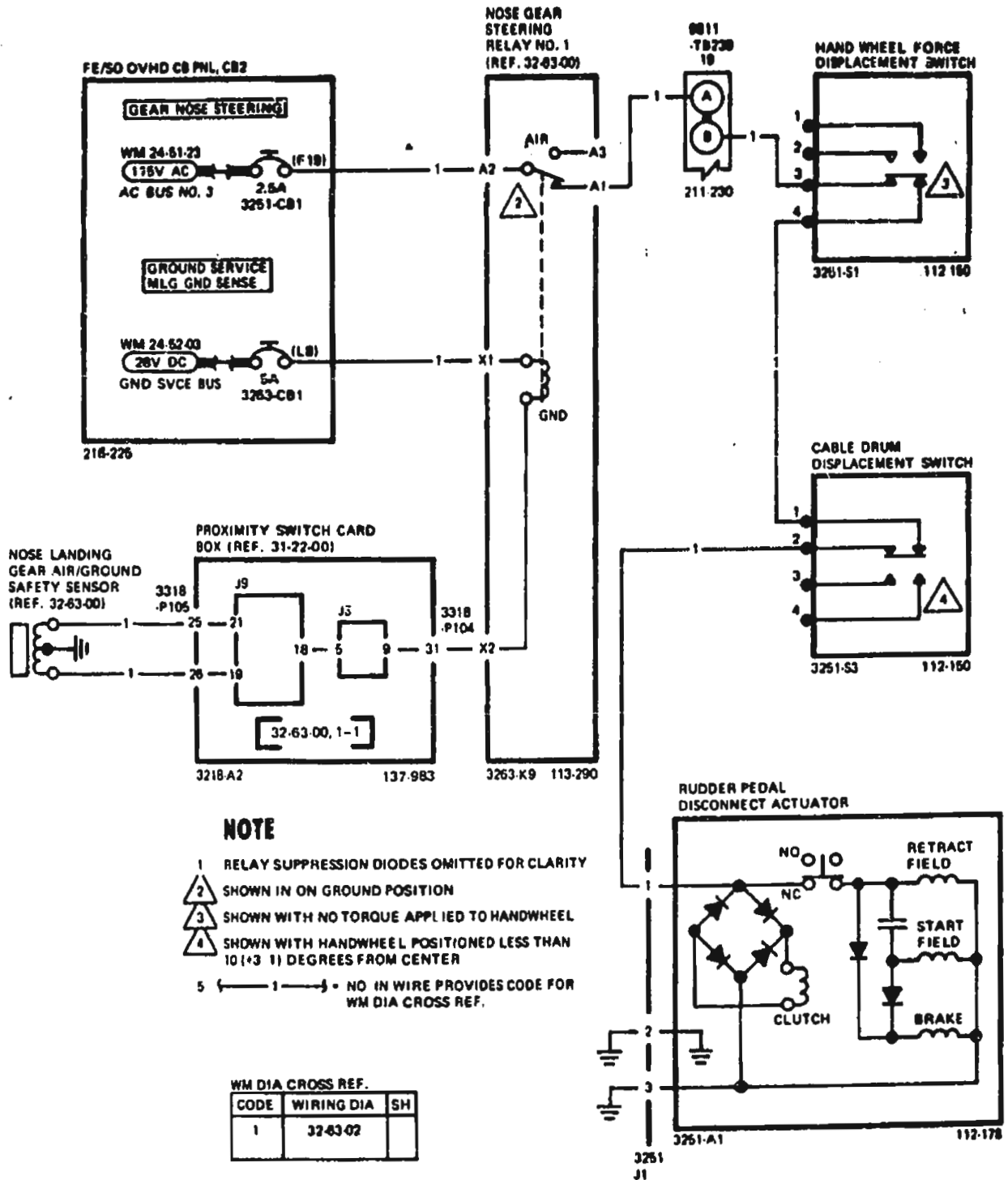
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Page 7/8
Mar 15/84

EFFECTIVITY: ALL

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MAINTENANCE MANUAL



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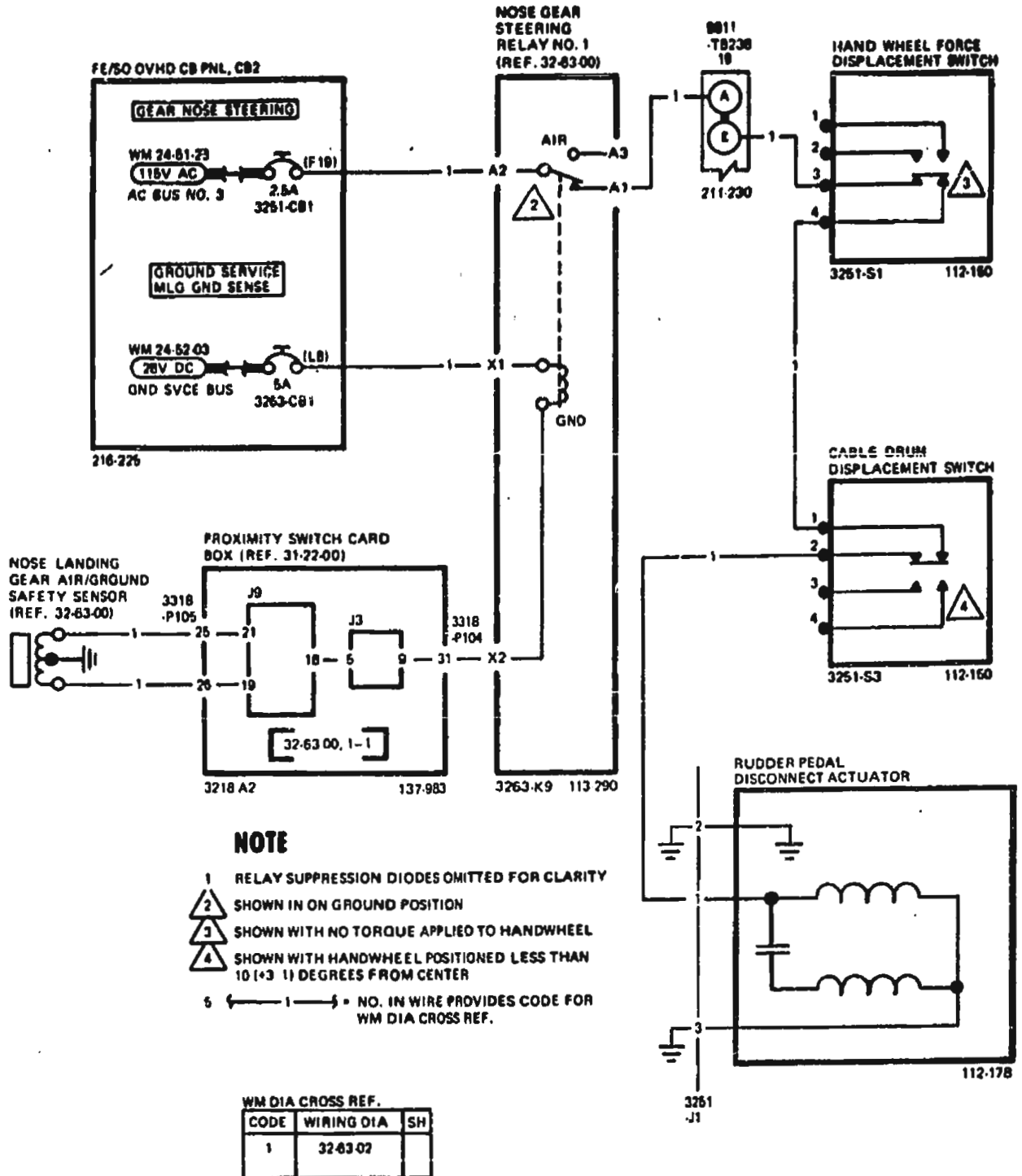
Nose Landing Gear Steering System Electrical Schematic
Figure 3

32-51-00
Page 9
May 15/88

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EFFECTIVITY: WITHOUT SB32-137

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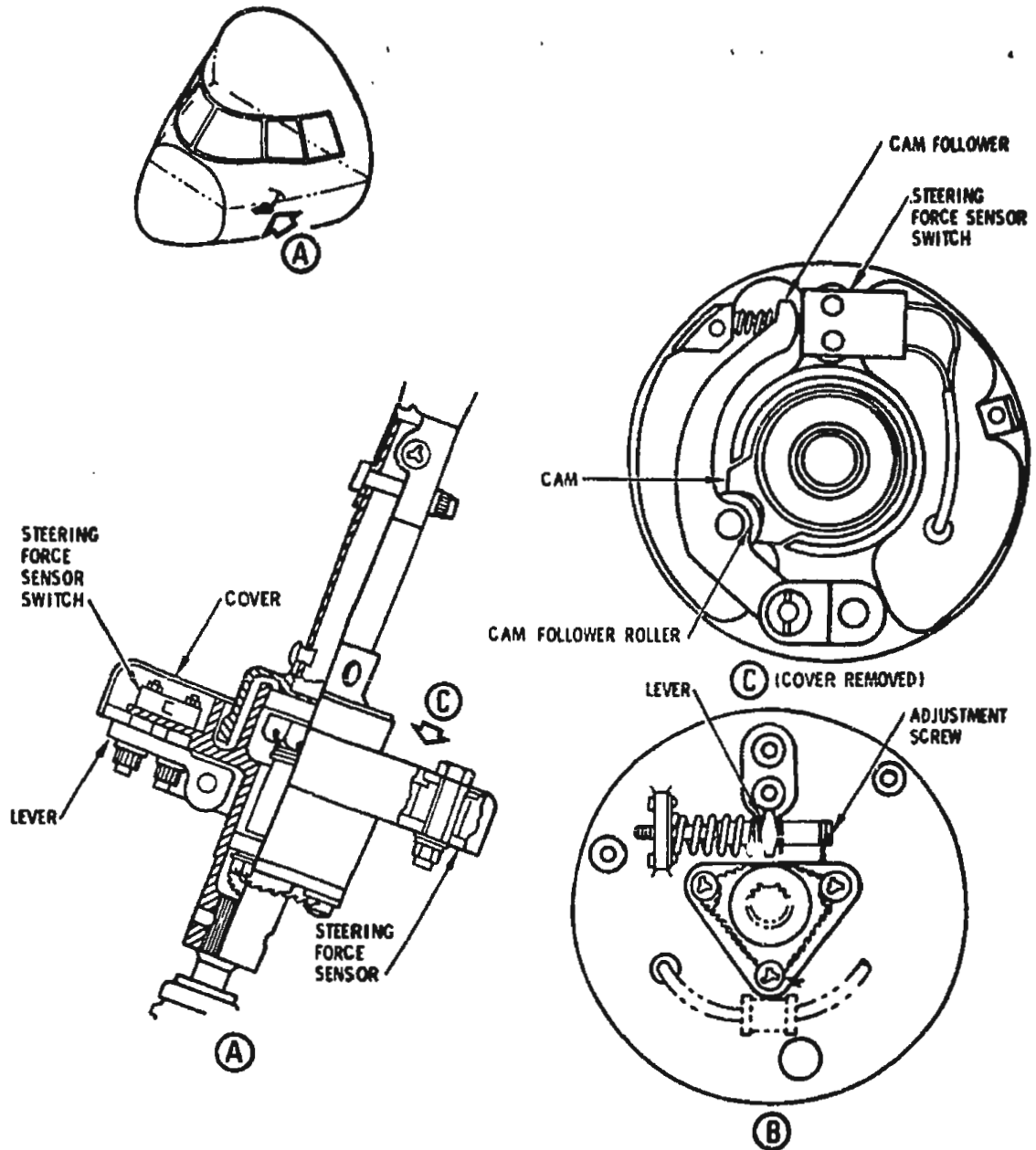
Nose Landing Gear Steering System Electrical Schematic
Figure 3

EFFECTIVITY: WITH SB32-137

32-51-00
Page 10
May 15/88

001B

LOCKHEED
MAINTENANCE MANUAL



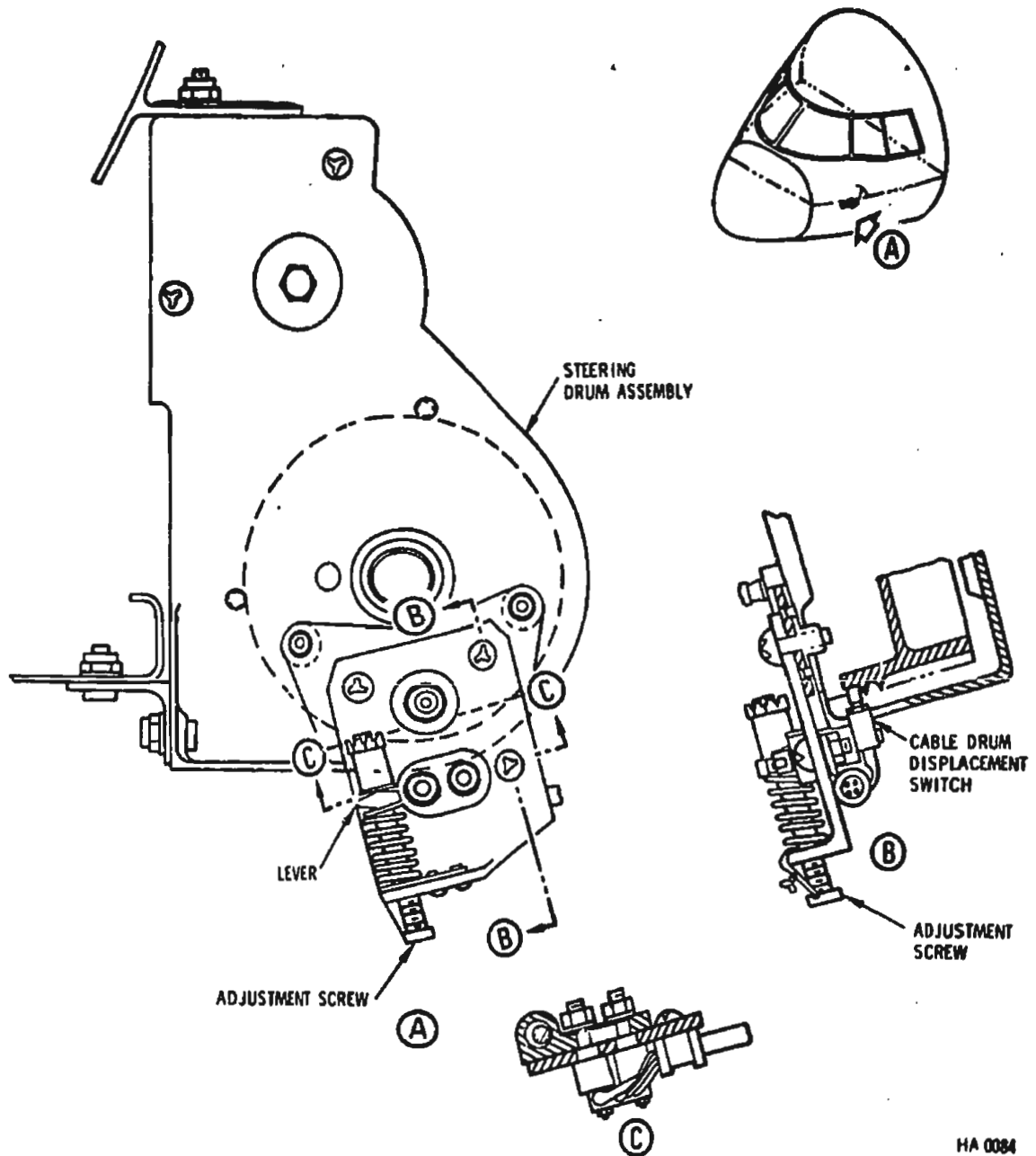
HA 0022
M1-1801-32-220

Handwheel Force Displacement Switch
Figure 4

R R
001B EFFECTIVITY: ALL

32-51-00
Page 11
May 15/88

LOCKHEED
MAINTENANCE MANUAL

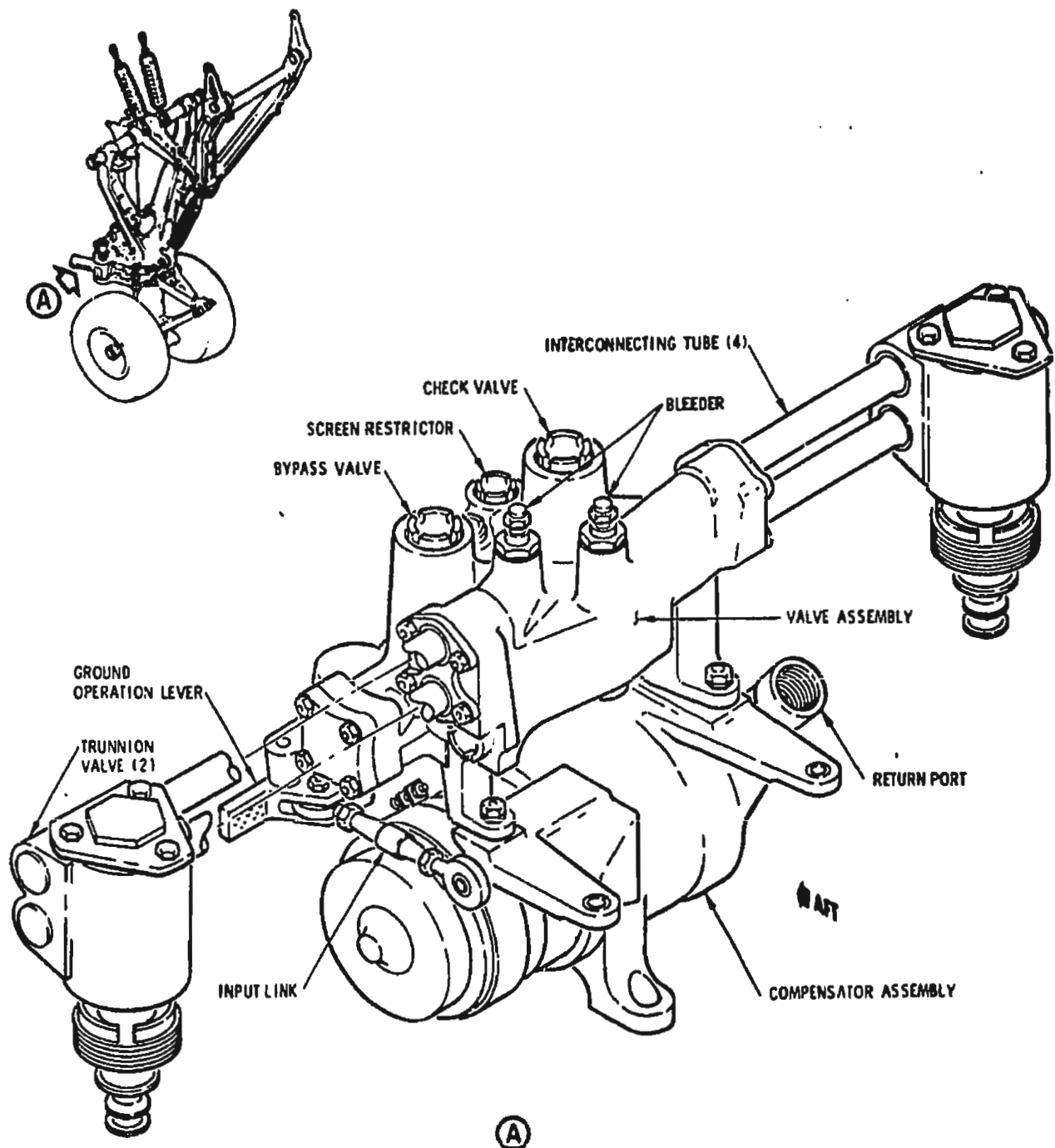


Cable Drum Displacement Switch
Figure 5

R EFFECTIVITY: ALL
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001B

32-51-00
Page 12
May 15/88

LOCKHEED
MAINTENANCE MANUAL



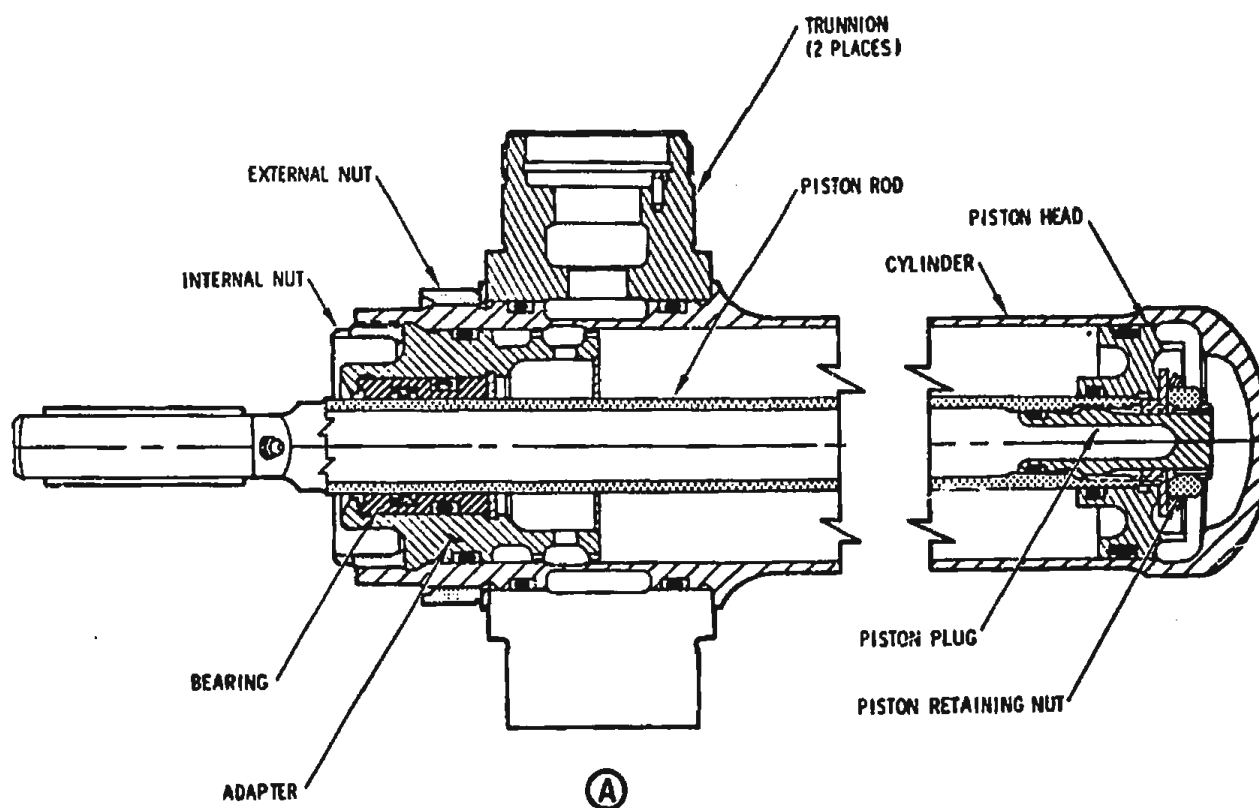
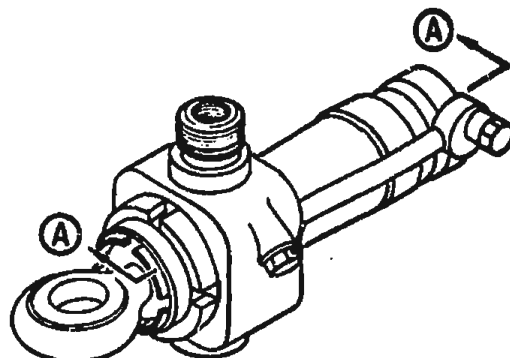
HM 4420
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Nose Landing Gear Steering Valve System
Figure 6

R EFFECTIVITY: ALL
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001B

32-51-00
Page 13
May 15/88

LOCKHEED
MAINTENANCE MANUAL



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Nose Landing Gear Steering Actuator
Figure 7

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EFFECTIVITY: ALL

32-51-00
Page 14
May 15/88

LOCKHEED
MAINTENANCE MANUAL

R NOSE GEAR STEERING SYSTEM - FAULT ISOLATION

R 1. General

R Reference data and fault isolation procedures for
R troubleshooting landing gear system faults are included in this
R section of the manual. A landing gear system malfunction
R detected by the flight crew is normally entered in the aircraft
R flight log book and reported to maintenance personnel by a FIRM
R fault code number. This number and the flight log book write-up
R can be found in the Chapter 32 Fault Code Index. The index
R specifies the maintenance manual section, fault isolation
R diagram figure number and, where appropriate, a block number
R indicating the diagram entry point containing the fault
R isolation procedure. When no block number is specified, the
R diagram entry point is Block 1.

R Prerequisites listed at the top of each diagram identify
R mandatory preliminary steps and circuit breakers that must be
R closed before initiating any fault isolation step.

R Schematic diagrams, identified by a SCHEM number, supplement
R fault isolation procedures as maintenance aids. The schematics
R show the basic system circuitry necessary for troubleshooting
R and include cross-reference indexes to the wiring diagram manual
R pages required for checking component interconnect wiring.

R 2. Supplemental data

R Supplementary data includes Functional tests, checkout tests,
R BITE checks and other general information that can be helpful in
R performing fault isolation. Supplementary data in this section
R is listed in Table 101.

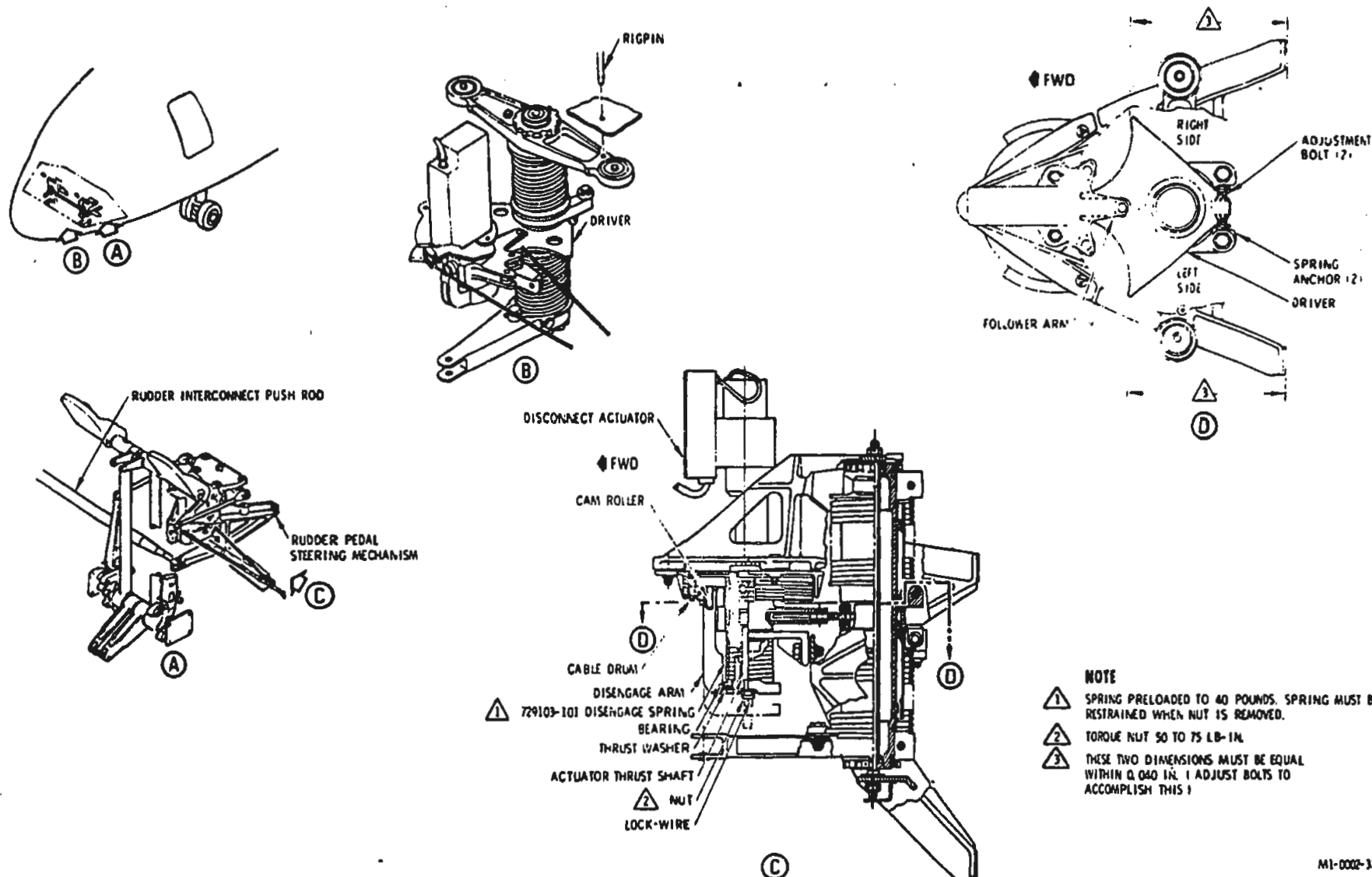
Supplemental Data Table 101	
FIGURE	TITLE
101	Nose Gear Steering System Hydraulic Diagram

R 3. Fault Isolation

R Table 102 is a list of fault isolation data in this section of
R the manual

R EFFECTIVITY: ALL
R
001B

32-51-00
Page 101
Mar 15/81



NOTE

- 1 SPRING PRELOADED TO 40 POUNDS. SPRING MUST BE RESTRAINED WHEN NUT IS REMOVED.
- 2 TORQUE NUT 50 TO 75 LB-IN.
- 3 THESE TWO DIMENSIONS MUST BE EQUAL WITHIN 0.040 IN. 1 ADJUST BOLTS TO ACCOMPLISH THIS 1

Nose Landing Gear Rudder Pedal Steering Mechanism
Figure 8

32-51-00
Page 15/16
Mar 15/84

M1-0002-32-330

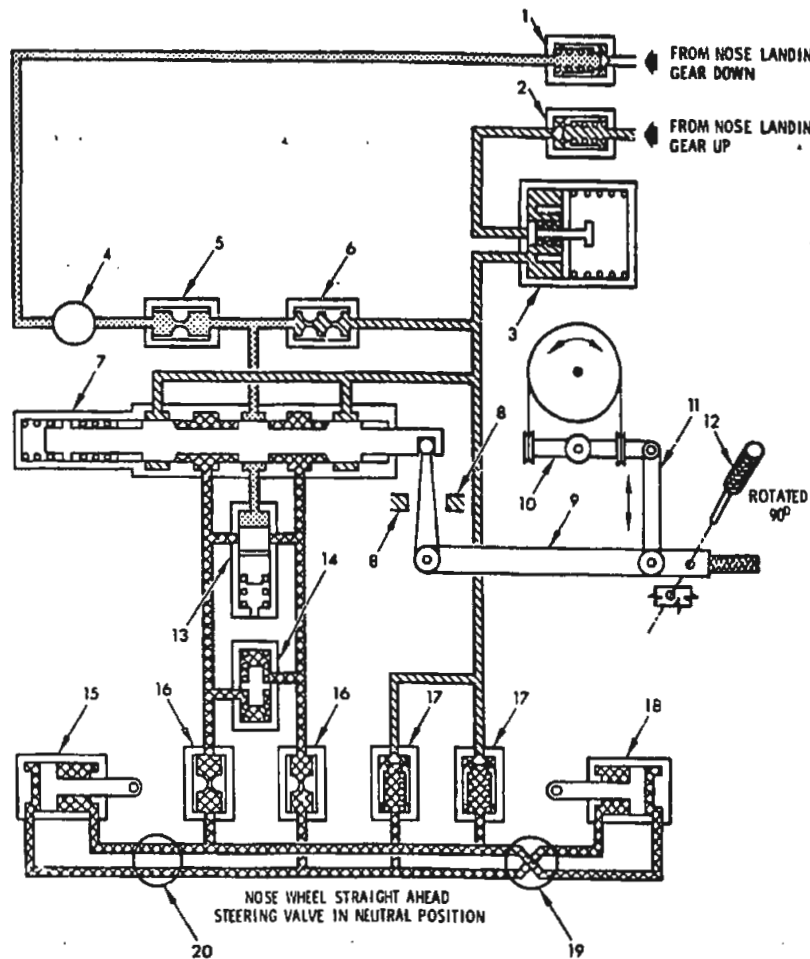
Nose Gear Steering System Fault Isolation
Table 102

FIGURE	TITLE
102	Component Location Index
103	Nose Gear Steering Components Locator Diagram
104	No Rudder Pedal Steering
105	Hand Wheel Steering Fault Isolation
106	Nose Gear Shakes When Wheels Are Rotating
R 107	Aircraft Pulls to Left or Right During Taxiing
SCHEM 1	Nose Gear Steering System Electrical Schematic

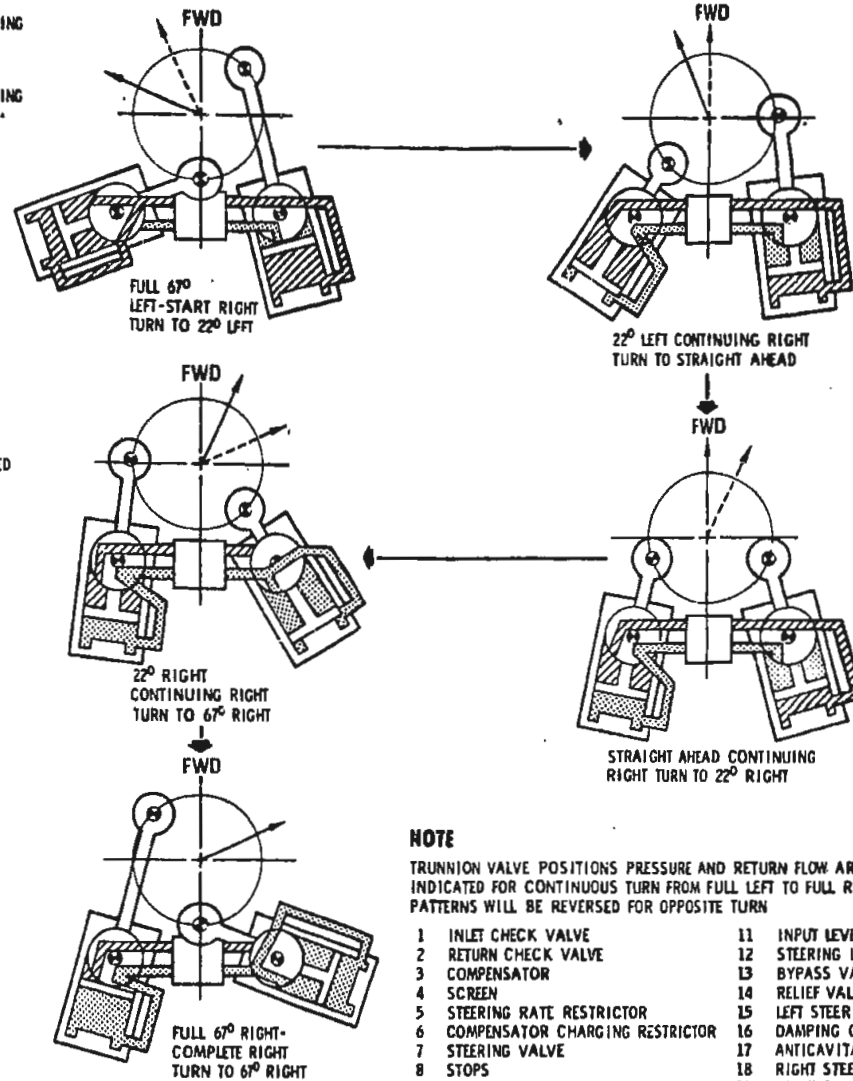
EFFECTIVITY: ALL

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32-51-00
Page 102
Nov 15/83



CODE
 RETURN
 PRESSURE
 STATIC (STRAIGHT AHEAD)



NOTE

TRUNNION VALVE POSITIONS PRESSURE AND RETURN FLOW ARE INDICATED FOR CONTINUOUS TURN FROM FULL LEFT TO FULL RIGHT. PATTERNS WILL BE REVERSED FOR OPPOSITE TURN

- | | |
|-----------------------------------|----------------------------|
| 1 INLET CHECK VALVE | 11 INPUT LEVER |
| 2 RETURN CHECK VALVE | 12 STEERING LOCKOUT PIN |
| 3 COMPENSATOR | 13 BYPASS VALVE |
| 4 SCREEN | 14 RELIEF VALVE |
| 5 STEERING RATE RESTRICTOR | 15 LEFT STEERING ACTUATOR |
| 6 COMPENSATOR CHARGING RESTRICTOR | 16 DAMPING ORIFICE |
| 7 STEERING VALVE | 17 ANTICAVITATION VALVE |
| 8 STOPS | 18 RIGHT STEERING ACTUATOR |
| 9 GROUND OPERATION LEVER | 19 RIGHT STEERING TRUNNION |
| 10 STEERING VALVE BEAM | 20 LEFT TRUNNION VALVE |

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Nose Gear Steering Hydraulic Diagram
Figure 101

EFFECTIVITY: ALL

32-51-00
Page 103/104
Aug 15/81

001B

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MAINTENANCE MANUAL

COMPONENT	QTY	AREA/ACCESS	REFERENCE
ACTUATOR - NLG STEERING DISCONNECT	1	CAPT RUDDER PEDAL CVR	32-51-03
DRUM - HANDWHEEL CABLE	1	CAPT SIDE CONSOLE, P14	32-51-12
RELAY - NO. 1 NOSE GEAR STEERING	1	FESC, 112AB, 211AB	32-63-00
SWITCH - CABLE DRUM DISPLACEMENT	1	CAPT SIDE CONSOLE, P14	32-51-15
SWITCH - HANDWHEEL FORCE SENSOR	1	CAPT SIDE CONSOLE, P14	32-51-13
VALVE - NLG STEERING	1	ON NLG	32-51-08
WHEEL - NLG	2	NLG	32-42-01

M1-0000-32-2072

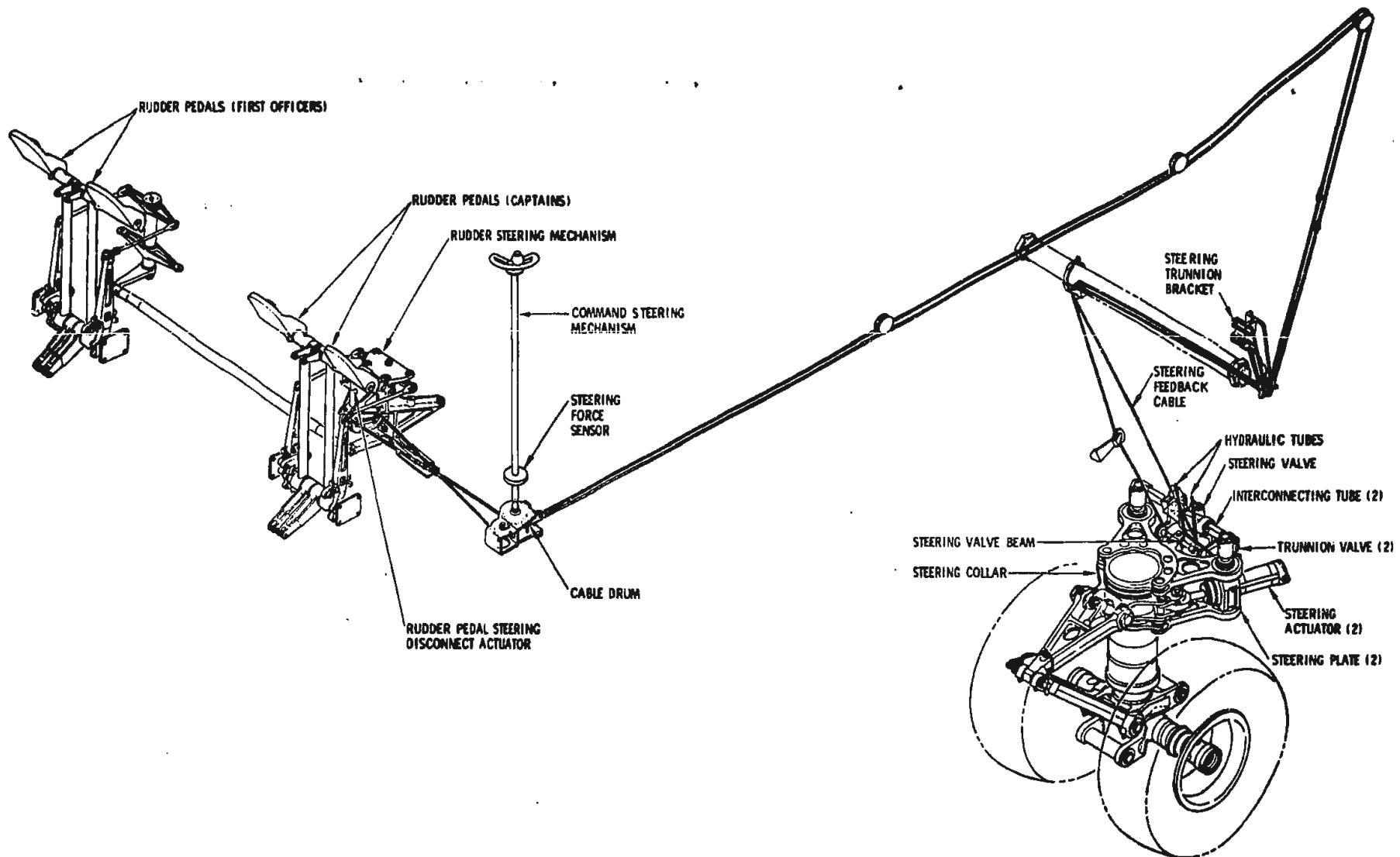
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Component Location Index
Figure 102

EFFECTIVITY: ALL

001B

32-51-00
Page 105/106
Jul 15/84



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Nose Landing Gear Steering System Component Locator
Figure 103

R EFFECTIVITY: ALL
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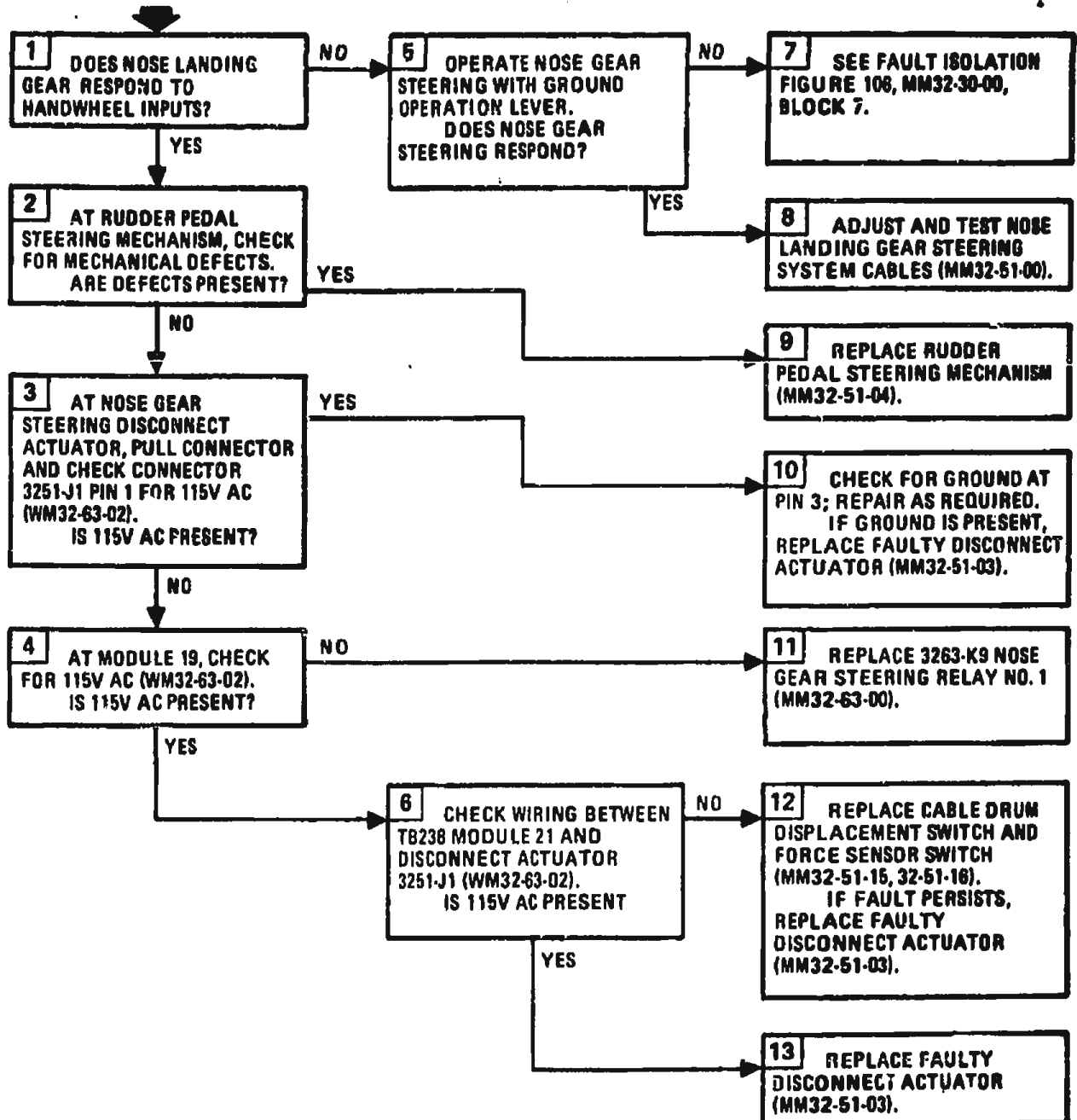
32-51-00
Page 107/108
Mar 15/84

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MAINTENANCE MANUAL

PREREQUISITES

ELECTRICAL POWER (MM24-41-00)
HYDRAULIC SYSTEM C ON (MM28-11-00)
CB'S: CB2-F19, L8
NOSE WHEEL STRAIGHT AHEAD
HANDWHEEL AT 0°
AIR/GROUND SENSING SYSTEM OPERATIONAL (MM32-63-00)

**NO RUDDER PEDAL
OR HANDWHEEL
STEERING**



M1-0000-32-2973

R
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No Rudder Pedal or Handwheel Steering
Figure 104

EFFECTIVITY: ALL

001B

32-51-00
Page 109
Jul 15/84



MAINTENANCE MANUAL

PREREQUISITES

ELECTRICAL POWER (MM24-41-00)

HYDRAULIC SYSTEM C ON (MM29-11-00)

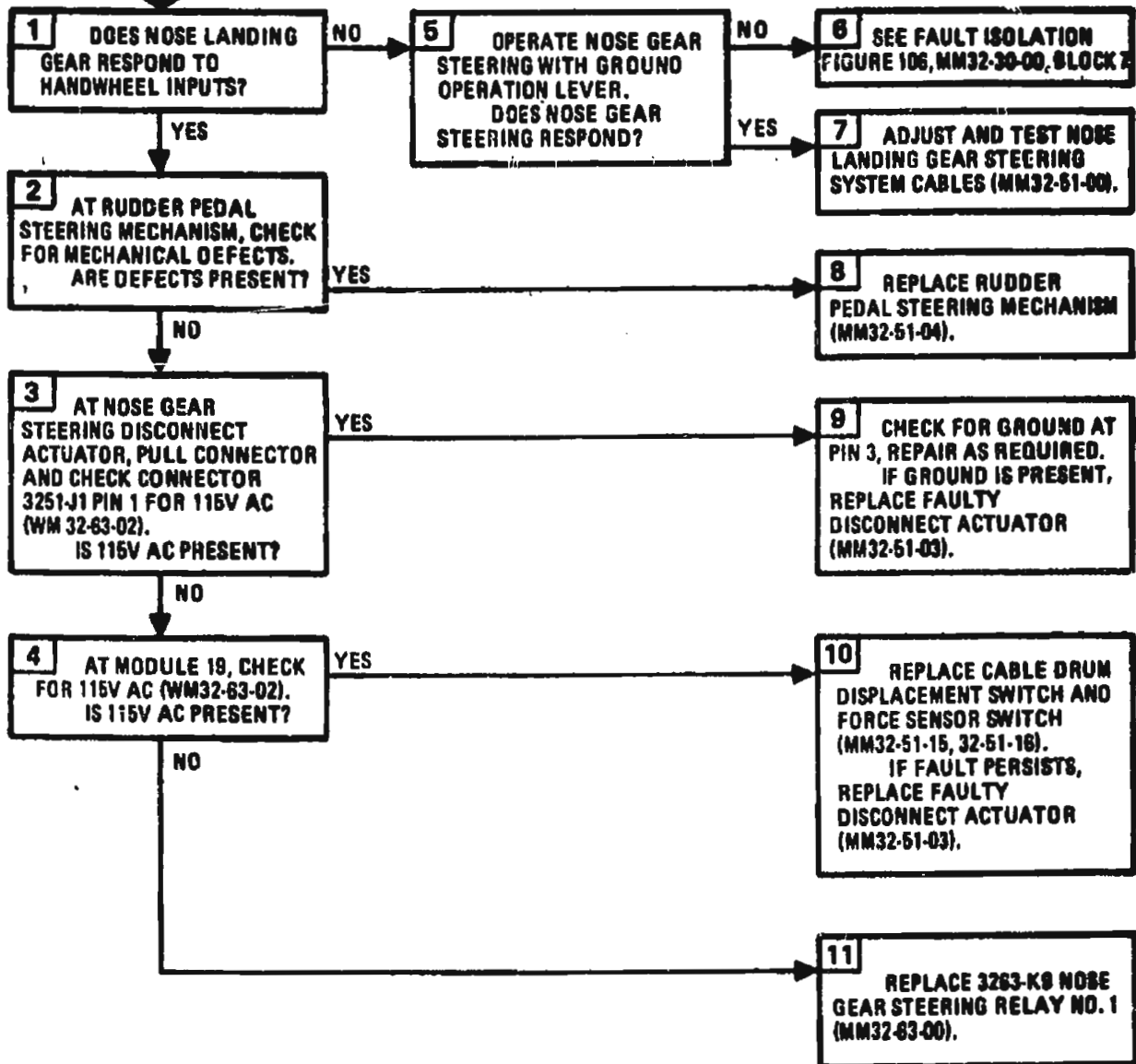
CB'S: CB2-F10, L0

NOSE WHEEL STRAIGHT AHEAD

HANDWHEEL AT 0°

AIR/GROUND SENSING SYSTEM OPERATIONAL (MM32-63-00)

NO RUDDER PEDAL
OR HANDWHEEL
STEERING



M1-0000-32-2874

R
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No Rudder Pedal or Handwheel Steering
Figure 104

EFFECTIVITY: 007-999

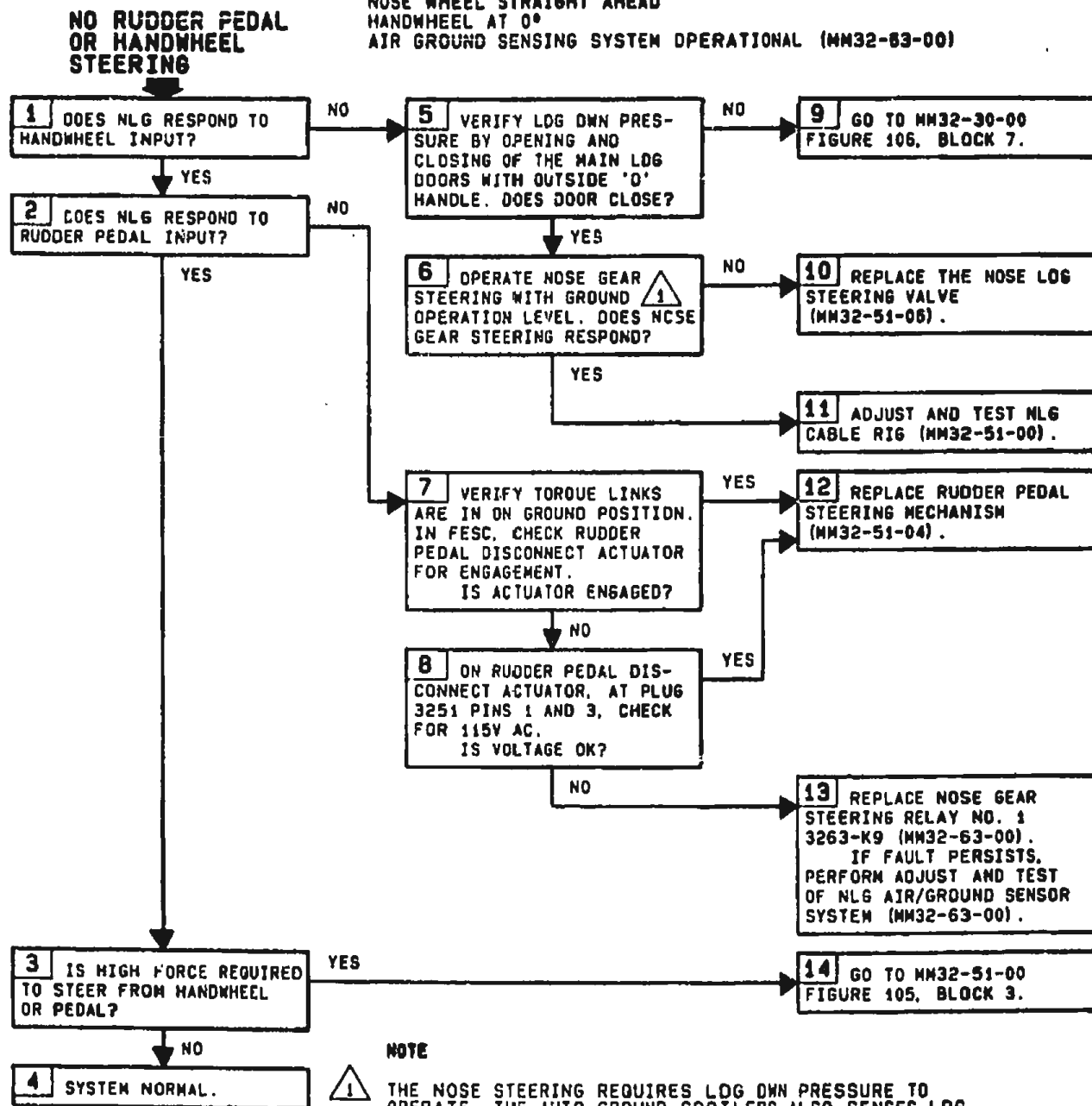
32-51-00
Page 110
Jul 15/84

001B



PREREQUISITES

ELECTRICAL POWER (MM24-41-00)
HYDRAULIC SYSTEM C ON (MM29-11-00)
CB'S: CB2-F19, L8
NOSE WHEEL STRAIGHT AHEAD
HANDWHEEL AT 0°
AIR GROUND SENSING SYSTEM OPERATIONAL (MM32-63-00)



M1-0007-32-589

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No Rudder Pedal or Handwheel Steering
Figure 104

EFFECTIVITY: 032-999

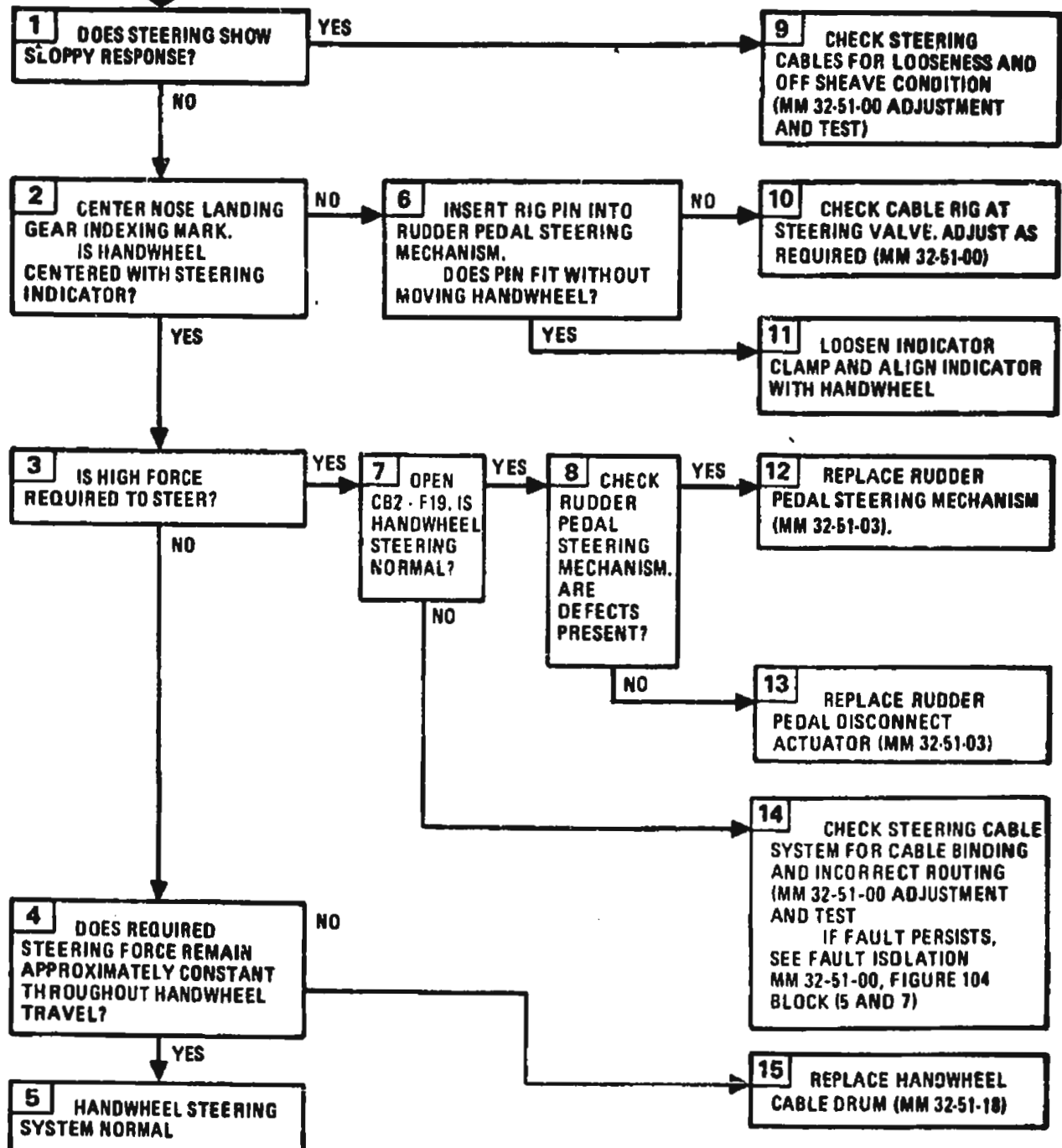
32-51-00
Page 111
May 15/87

001B

LOCKHEED
MAINTENANCE MANUAL

**HANDWHEEL
STEERING FAULT
ISOLATION**

PREREQUISITES
ELECTRICAL POWER (MM 24-41-00)
HYDRAULIC SYSTEMS ON (MM 28-11-00)
CB'S: CB2-F19, L8



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Handwheel Steering - Fault Isolation
Figure 105

EFFECTIVITY: ALL

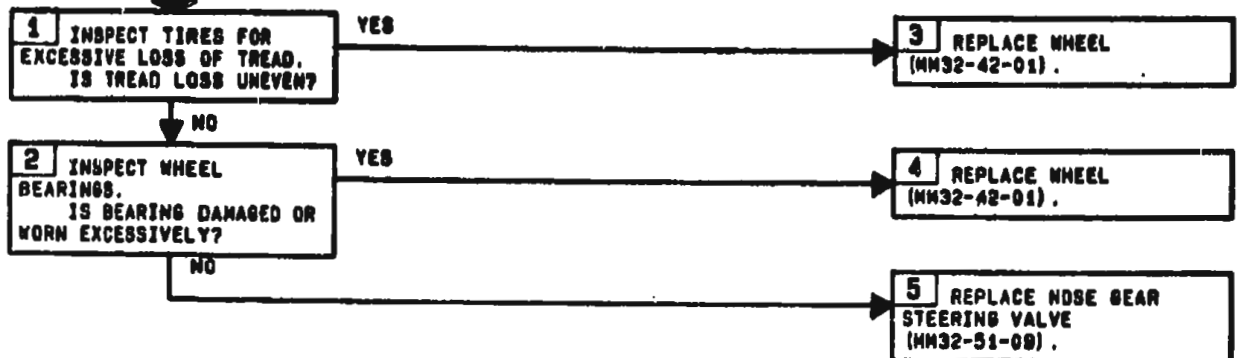
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32-51-00
Page 112
Jul 15/84

LOCKHEED
MAINTENANCE MANUAL

PREREQUISITES
NONE

**NOSE GEAR SHAKES WHEN
WHEELS ARE ROTATING**



NI-0001-22-041

Nose Gear Shakes When Wheels Are Rotating
Figure 106

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EFFECTIVITY: ALL

32-51-00
Page 113
Jul 15/84

LOCKHEED



MAINTENANCE MANUAL

PREREQUISITES

ELECTRICAL POWER (MM24-41-00)

HYDRAULIC SYSTEM C ON (MM20-11-00)

CB'S: CB2-F10, L0

NOSE WHEEL STRAIGHT AHEAD

HANDWHEEL AT 0°

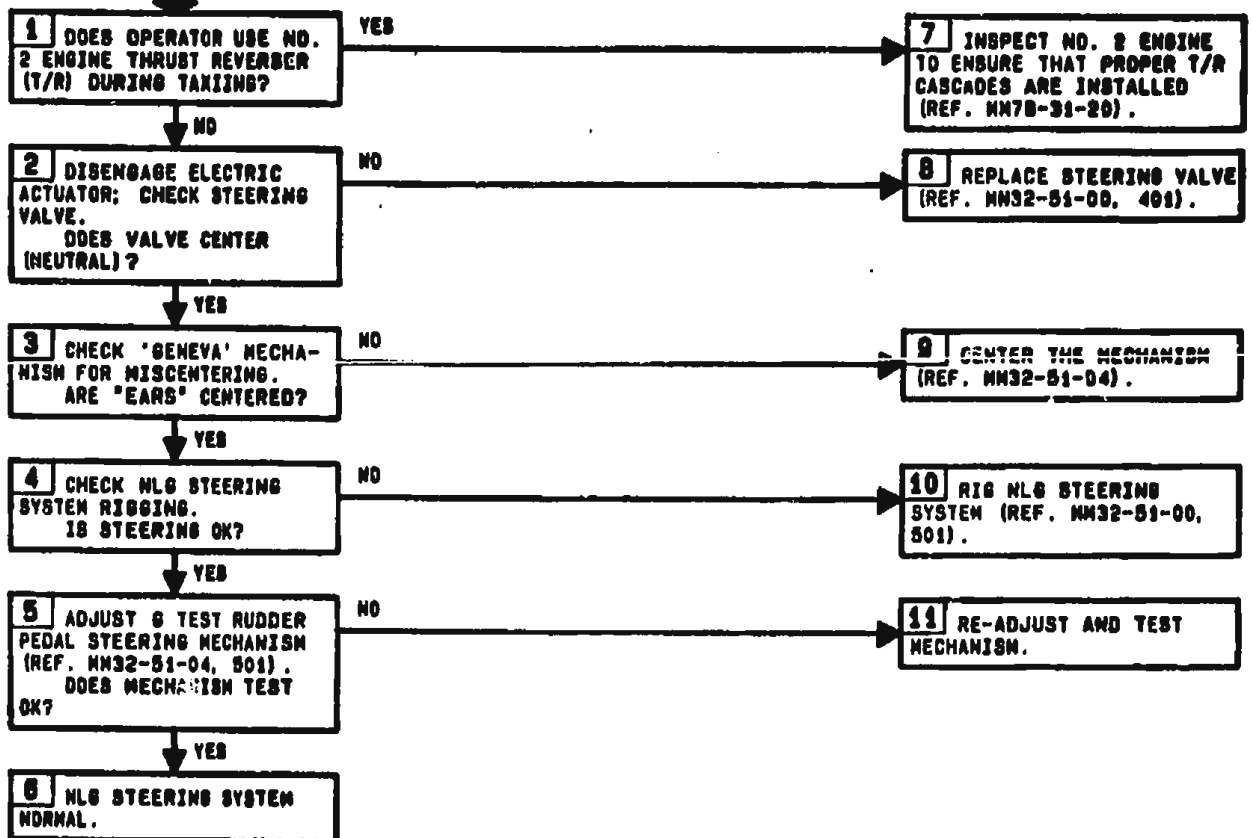
AIR/GROUND SENSING SYSTEM OPERATIONAL (MM32-03-00)

NO. 2 ENG THRUST REVERSER ACTUATED (ROLLS

ROYCE RD.211 ENGINE MAINTENANCE MANUAL

(MM70-30-00)

AIRCRAFT PULLS TO LEFT OR RIGHT WHILE TAXIING WITH ENGINE IDLE POWER



11-0000-00-0040

Aircraft Pulls to Left or Right during taxiing
Figure 107

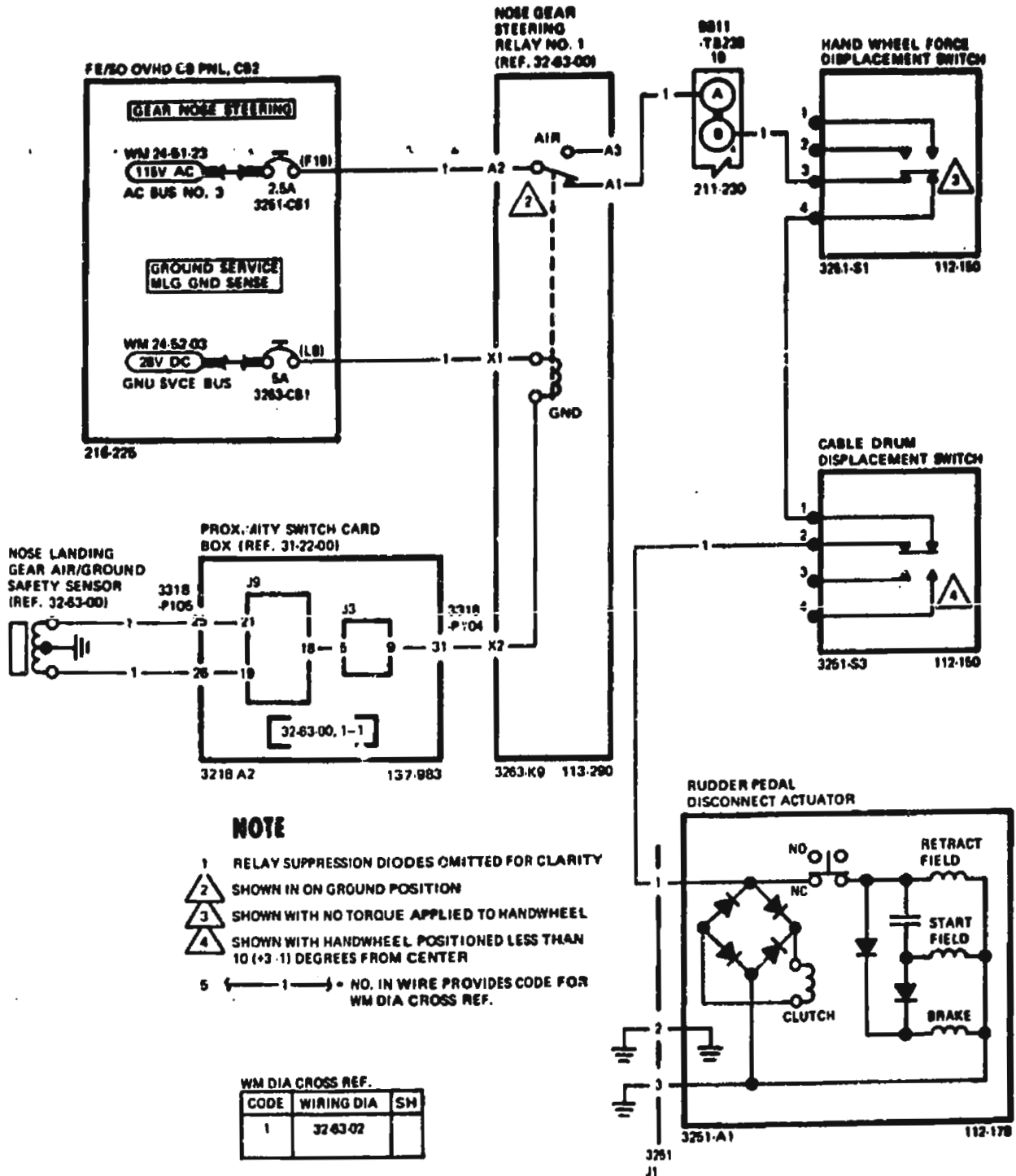
R R EFFECTIVITY: ALL

001B

32-51-00
Page 114
Jul 15/84

LOCKHEED

MAINTENANCE MANUAL



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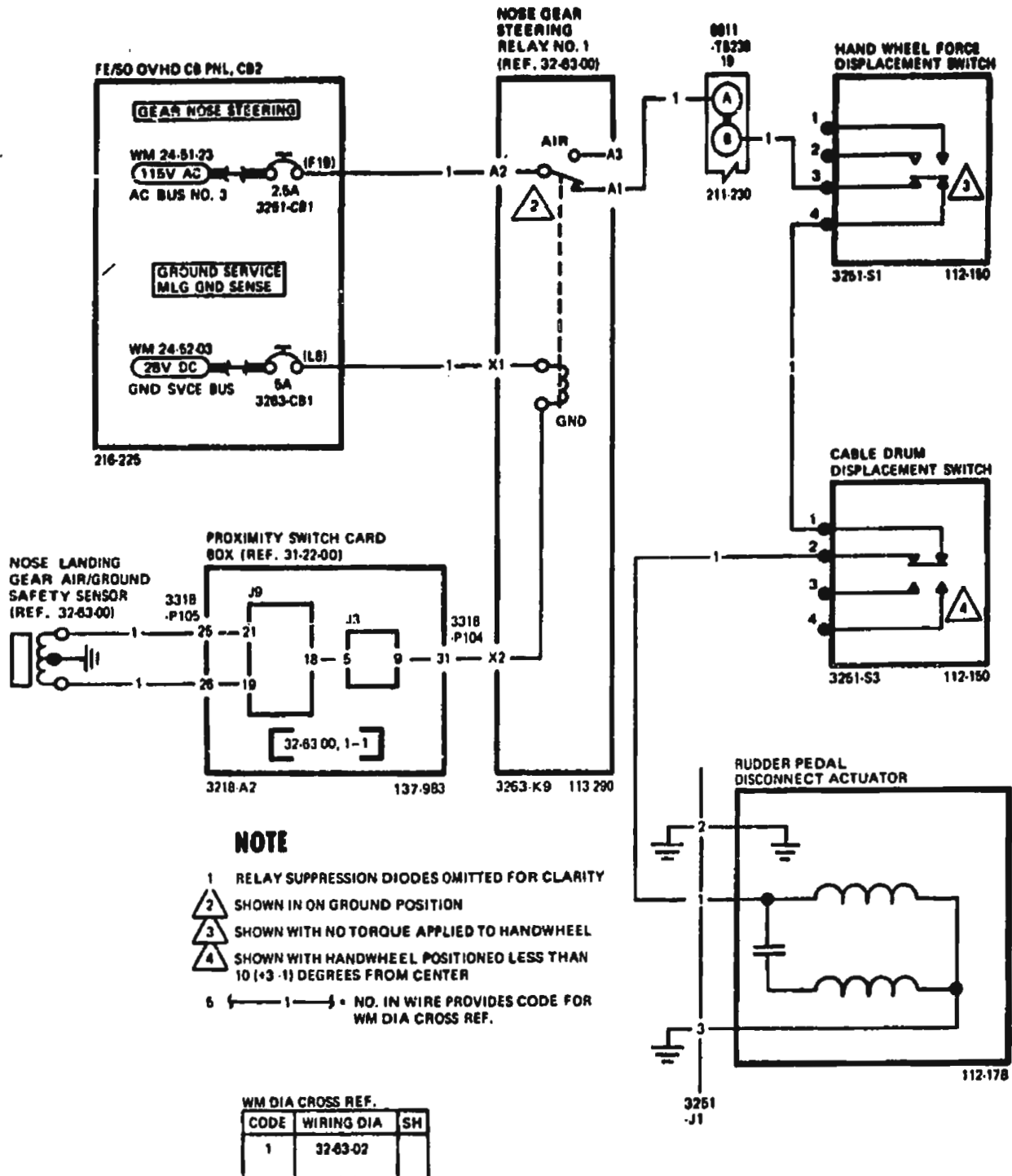
Nose Gear Steering System Electrical Schematic
SCHEM 1

EFFECTIVITY: WITHOUT SB32-137

32-51-00
Page 115
May 15/88

R
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001B

LOCKHEED
MAINTENANCE MANUAL



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Nose Landing Gear Steering System Electrical Schematic
SCHEM 1

EFFECTIVITY: WITH SB32-137

32-51-00
Page 116
May 15/88

001B

LOCKHEED
MAINTENANCE MANUAL

NOSE GEAR STEERING SYSTEM - ADJUSTMENT AND TEST

1. General

This adjustment and test procedure contains instructions required to rig the nose landing gear (NLG) steering system cables and rudder pedal disconnect actuator switches. Particular attention must be given to temperature requirements while this procedure is being performed. The aircraft and cable temperatures should be stabilized during rigging operations. Air conditioning equipment should not be in operation prior to and during rigging procedures. Tension specified is based on a temperature of 70 degrees Fahrenheit. The temperature-rig load chart must be used to make corrections to rigging tension at other temperatures.

2. Equipment and Materials

Rigpins, 5/16-inch diameter (2)

Greased skid plates (2)

R Cable Tensiometer Lockheed P/N L707E8-24, or equivalent

Pull scale, capable of indicating 100-lb pull

Force Gage, Chatillon 0-150 lb capacity, Model DPPH100, or equivalent

Nose landing gear steering valve centering pin

Cotter pin, MS24665-153, or equivalent

3. Referenced Procedures

20-31-01 Proximity Sensor Artificial Target - Maintenance Practices

23-51-09 Headset Stowage and Microphone Selector Console Assembly - Removal and Installation

24-00-00 Electrical Power - Maintenance Practices

29-11-00 Hydraulic Power System - Maintenance Practices

29-21-00 Ram Air Turbine - Maintenance Practices

31-41-00 Weight and Balance System - Adjustment and Test

EFFECTIVITY: ALL

32-51-00
Page 501
May 15/90

001B



- 32-51-04 Rudder Pedal Steering Mechanism - Adjustment and Test
- 32-51-15 Nose Gear Steering Cable Drum Displacement Switch - Adjustment and Test
- 32-51-16 Nose Gear Steering Force Sensor Switch - Adjustment and Test

4. Adjustment/Test

A. Adjustment

- (1) Ensure that electrical power is turned on (Ref. 24-00-00).
- (2) Ensure that hydraulic system C pressure is on (Ref. 29-11-00).
- (3) Ensure that upper and lower NLG torque arms are disconnected.
- (4) On aircraft 001-031 without SB 32-094, ensure that NLG is centered (0-degree deflections) as follows:
 - (a) At right side of conduit guard, disconnect conduit clamp from guard (Ref. Fig. 501).
 - (b) At right front of conduit guard, disconnect conduit bracket from guard.
 - (c) At right and left ends of conduit guard, remove nuts securing guard to steering collar.
 - (d) Remove conduit guard.
 - (e) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, open and tag FLIGHT STATION MISC - WEIGHT & BALANCE - AC (F5) and DC (F6) circuit breakers.
 - (f) Disconnect conduit connector.
 - (g) Using a tow bar or equivalent device, manually center nose gear so that center mark on bearing is aligned with index mark on strut. Use wheel chocks and bar to retain nose gear straight ahead.
- (4) On aircraft 001-031 with SB 32-094 and 032-999, ensure that NLG is positioned so that center mark on

R EFFECTIVITY: ALL
R
001B

32-51-00
Page 502
May 15/90



bearing is aligned with index mark on strut. Use wheel chocks and bar to retain nose gear straight ahead. Observe center marks through view hole (Ref. Fig. 501).

- (5) Remove both halves of control column shroud.
- (6) Install rigpin R1 in left rudder linkage (Ref. Fig. 502, Views D and E).
- (7) Remove headset stowage and microphone selector console assembly (Ref. 23-51-09).
- (8) Install rigpin R2 in handwheel input cable drum assembly (Ref. Fig. 502, Views A and F). Pin may be installed through headset stowage opening or from below in the forward electronic service center.
- (9) Install centering pin C in nose gear steering hydraulic servo valve (Ref. Fig. 502, View G).

NOTE: It may be necessary to move the ground operation lever in order to line up the hole into which the centering pin is to be installed.

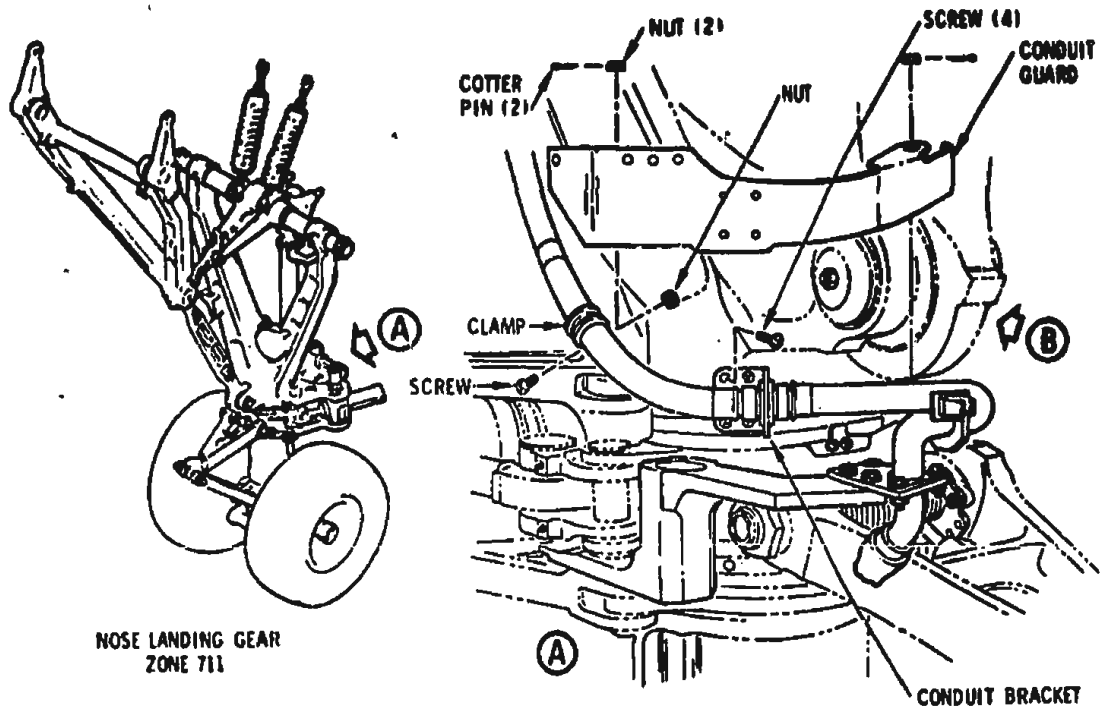
- (10) On aircraft 001-031 without SB 32-094, perform the following procedures:

- (a) Ensure that disconnect actuator is engaged.
- (b) Adjust turnbuckles T1 and T2 to obtain 45 (± 2.5) lbs tension at points P1 and P2. Do not allow a tension differential of more than 4 lbs during adjustment. Check to ensure that nose gear is centered.

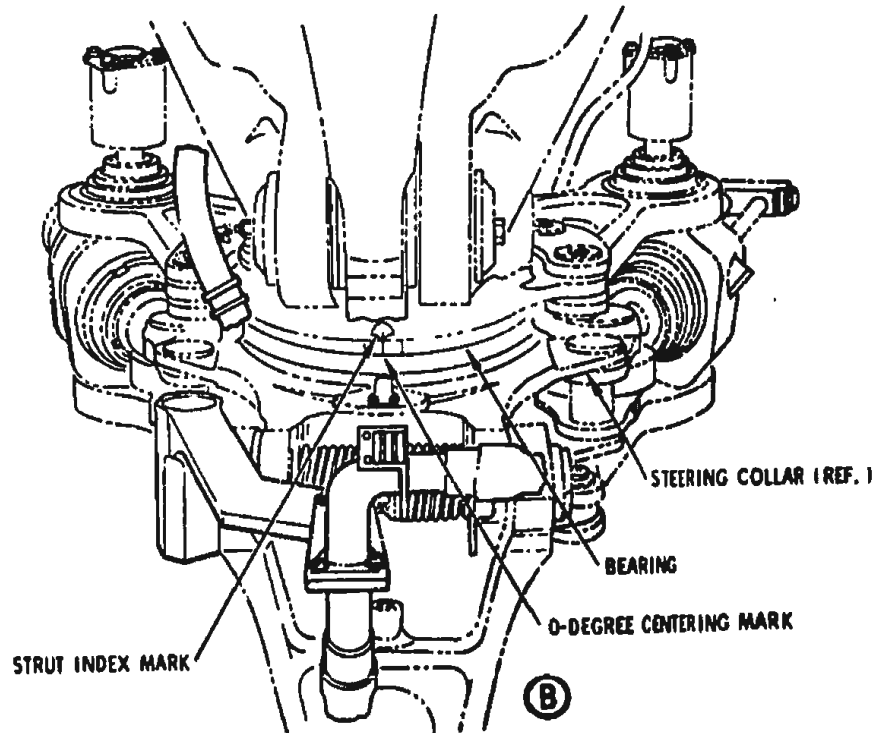
NOTE: A difference of not more than 4 lbs ensures that stops on rudder/steering interconnect override springs S (Ref. Fig. 502, View D) remain centered.

- (c) Adjust turnbuckle T3 (Ref. Fig. 502, View A) until rigpin R2 (Ref. Fig. 502, View F) can easily be removed without displacing drum. Check to ensure that nose gear is centered.
- (d) Verify that hydraulic system C pressure is on (Ref. 29-11-00).
- (e) Verify that electrical power is on (Ref. 24-00-00).

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NOSE LANDING GEAR
ZONE 711



M1-0120-32-438

Nose Gear Steering Indexing
Figure 501

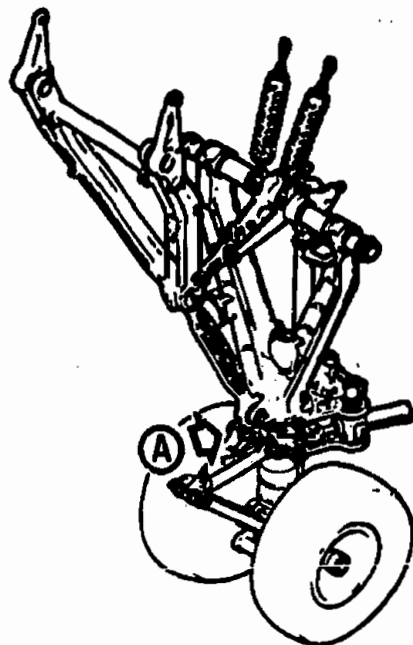
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EFFECTIVITY: 001-031 WITHOUT SB32-094

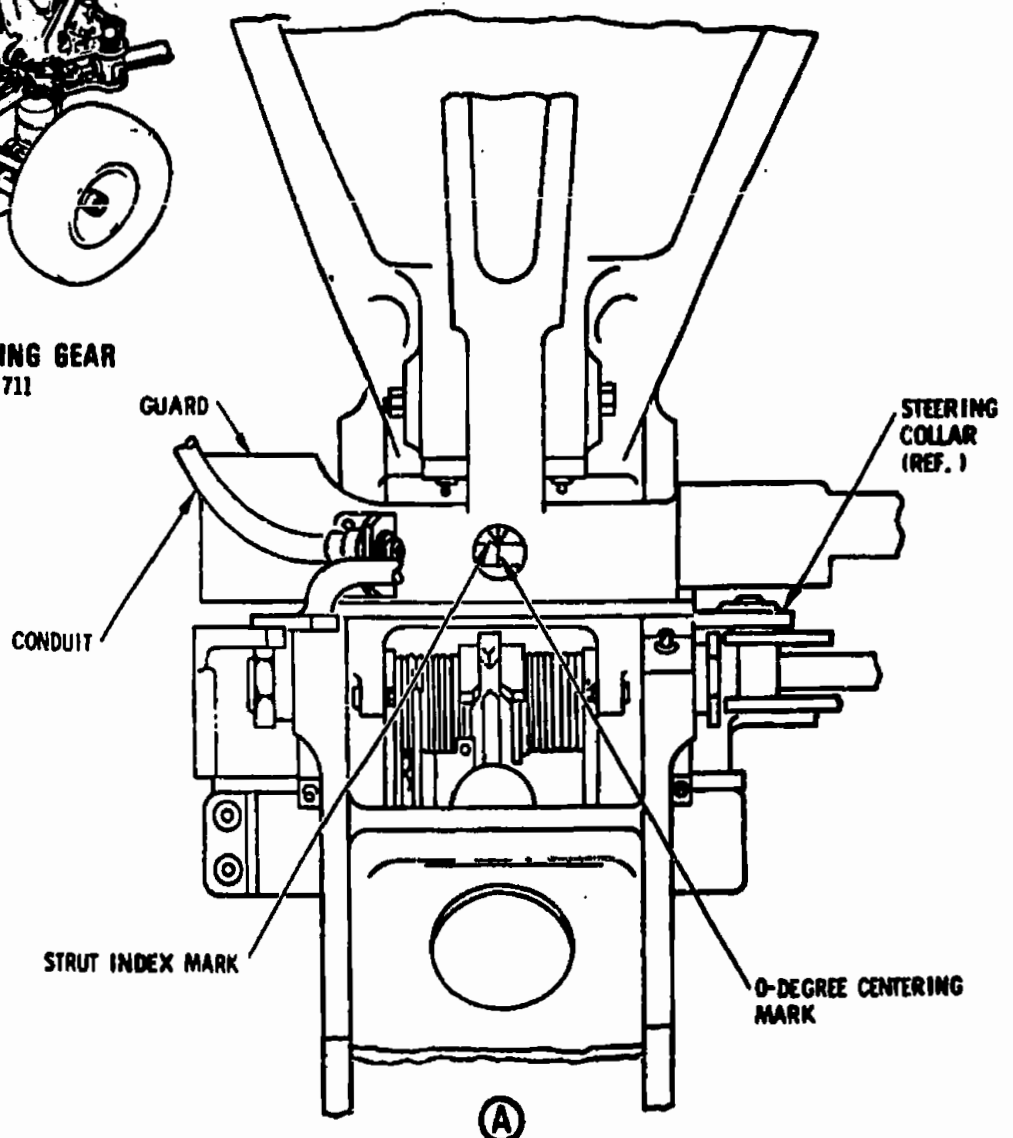
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32-51-00
Page 504
Mar 15/84

LOCKHEED
MAINTENANCE MANUAL



NOSE LANDING GEAR
ZONE 711



M1-0100-32-576

Nose Gear Steering Indexing
Figure 501

R EFFECTIVITY: 001-031 WITH SB32-094 AND 032-999
R
001B

32-51-00
Page 505
Jul 15/84

LOCKHEED
MAINTENANCE MANUAL

- (f) Verify that work stands and personnel are clear of rudder control surfaces.
- (g) Verify that torque arms are disconnected at apex pin.
- (h) If used, verify that steering angle limits scale is correctly positioned (Ref. 32-51-04).
- (i) Verify that LANDING GEAR control lever is in DOWN position.
- (j) Verify that following circuit breakers are closed:

CIRCUIT BREAKER	LOCATION
PROX SW PWR NO. 1 (L10)	CB1
PROX SW PWR NO. 4 (L11)	CB1
GEAR CONT. NO. 1 (F17)	CB2
GEAR CONT. NO. 2 (F18)	CB2
NOSE STEERING (F19)	CB2
MLG GND SENSE (L8)	CB2
PROXIMITY SWITCH 2 (H3)	CB3
PROXIMITY SWITCH 3 (H4)	CB3

- (k) Using steering handwheel, steer nose gear full right and full left five times.
- (l) Readjust turnbuckles T1 and T2 until slot in drum is aligned with disconnect actuator arm roller and rigpin R2 can be easily removed.

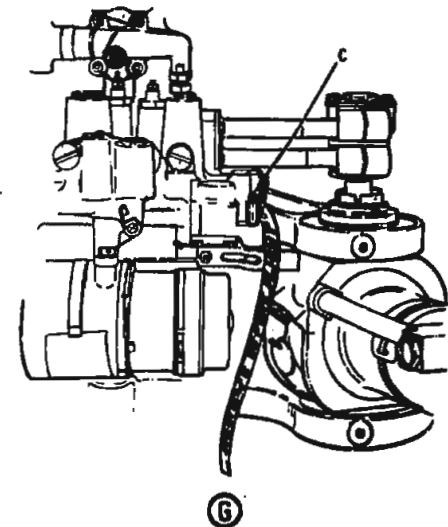
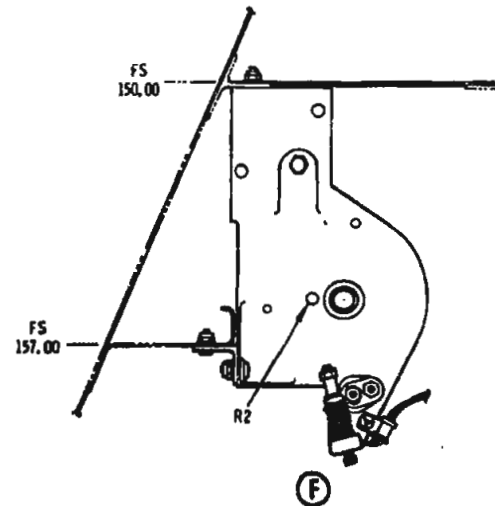
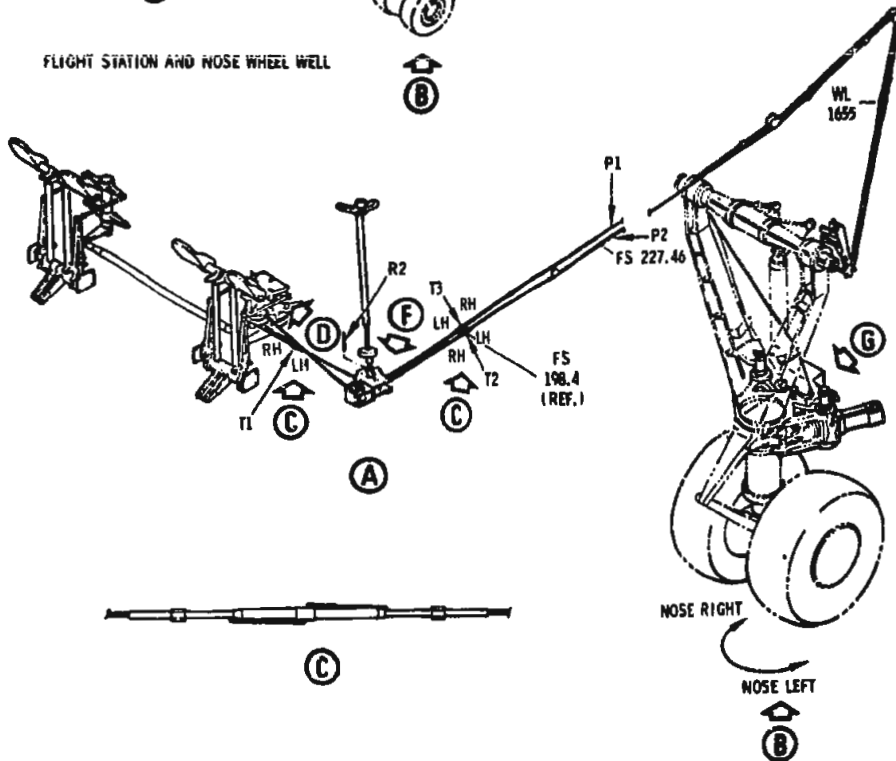
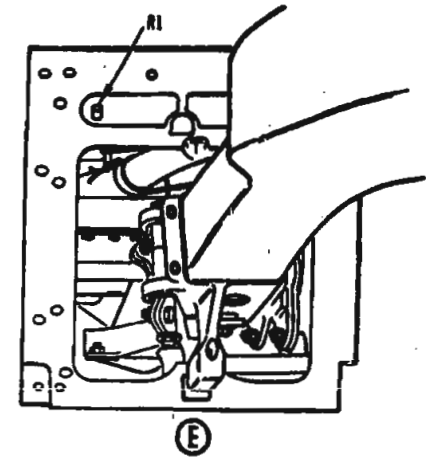
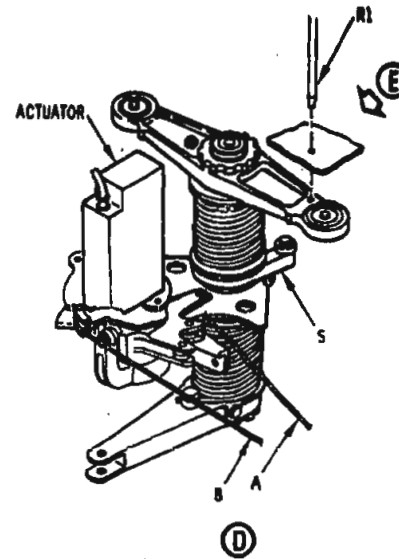
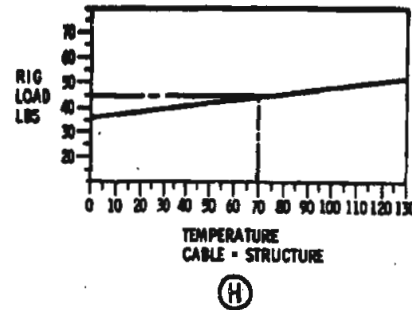
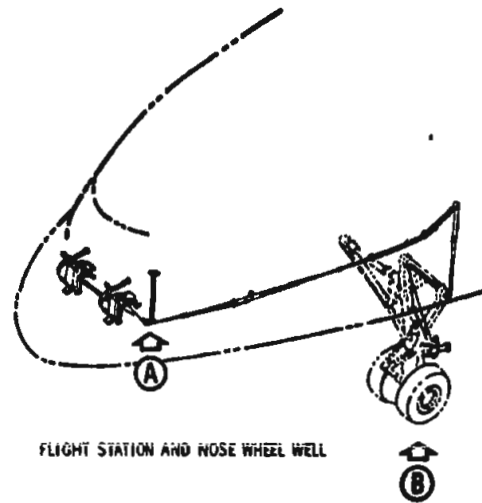
R (10) On aircraft 001-031 with SB32-094, and 032-999, perform the following procedures:

- (a) Ensure that disconnect actuator is disengaged.
- (b) Preadjust turnbuckle T2 to a dimension of 3.50 inches (Ref. Fig. 502, View C).
- (c) Adjust turnbuckles T3 and T4 to obtain a cable tension of 45 (± 2.5) lb at points P1 and P2, so that rig pin R2 can easily be removed.

EFFECTIVITY: ALL

001B

32-51-00
Page 506
Jul 15/84



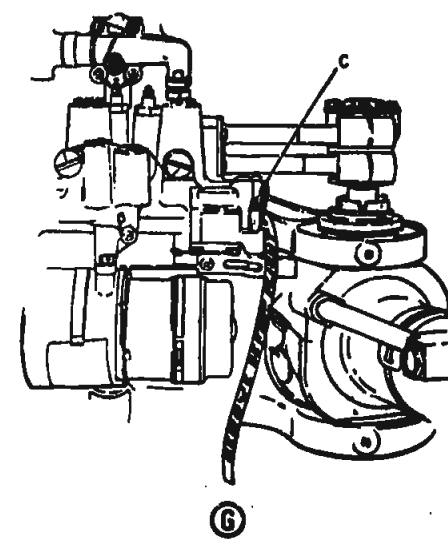
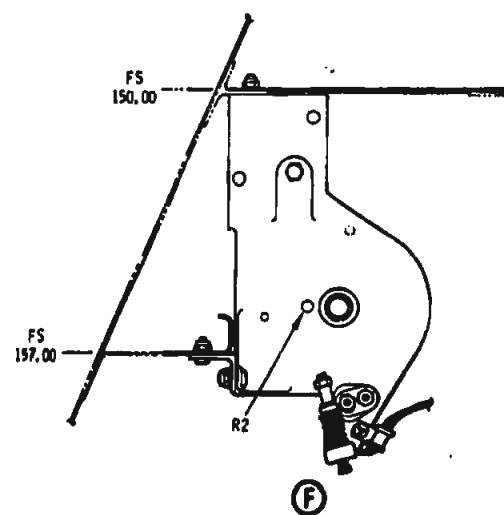
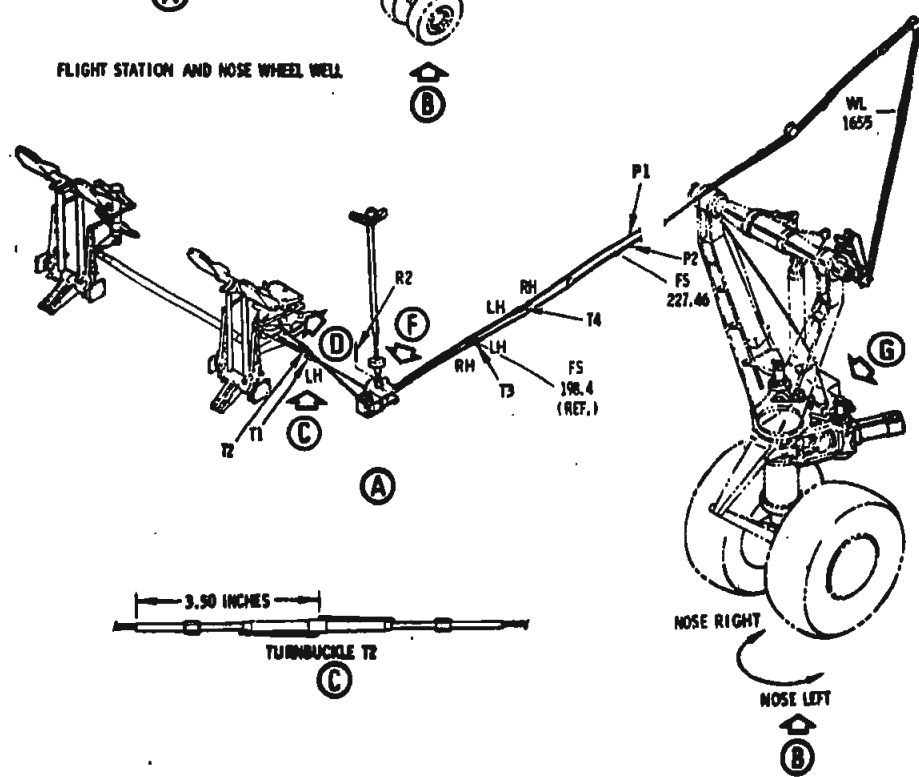
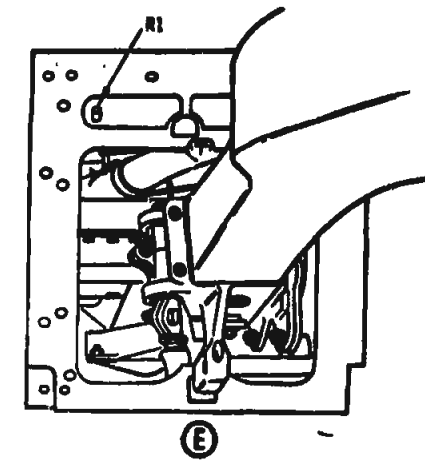
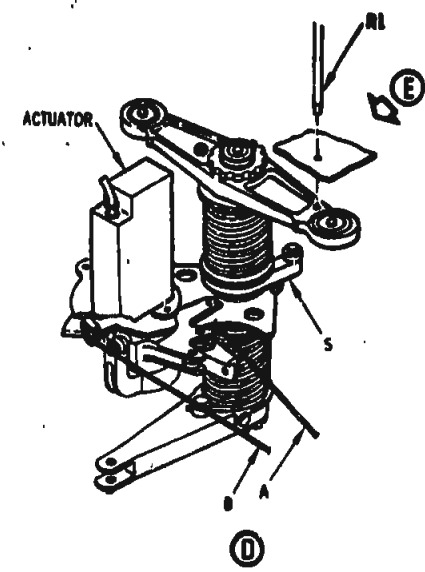
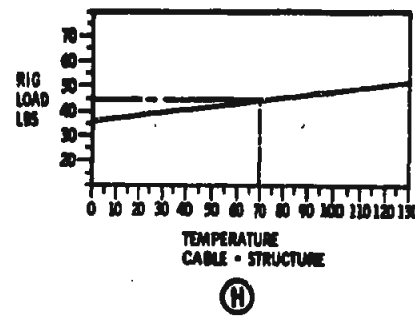
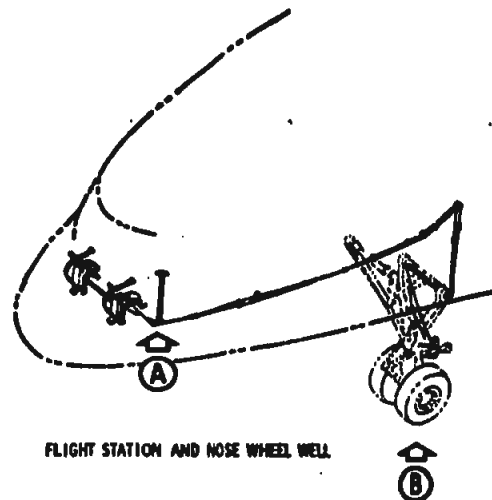
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Nose Gear Steering System - Adjustment and Test
Figure 502

EFFECTIVITY: 001-031 WITHOUT SB32-094

32-51-00
Page 507/508
Mar 15/84

R
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001B



Nose Gear Steering System - Adjustment and Test
Figure 502



MAINTENANCE MANUAL

- R (d) Adjust turnbuckles T1 and T2 to align slot in
R cable drum with disconnect actuator arm roller.
- R (e) Remove rig pin R2 and steering valve centering
R pin.
- R (f) Verify that hydraulic system C pressure is on
R (Ref. 29-11-00).
- R (g) Verify that electrical power is on (Ref.
R 24-00-00).
- R (h) Verify that torque arms are disconnected at apex
R pin.
- R (i) If used, verify that steering angle limits scale
R is correctly positioned (Ref. 32-51-04).
- R (j) Verify that LANDING GEAR control lever is in DOWN
R position.
- R (k) Verify that following circuit breakers are closed:

R	-----	
	CIRCUIT BREAKER	LOCATION
R	-----	
R	PROX SW PWR NO. 1 (L10)	CB1
R	PROX SW PWR NO. 4 (L11)	CB1
R	GEAR CONT. NO. 1 (F17)	CB2
R	GEAR CONT. NO. 2 (F18)	CB2
R	NOSE STEERING (F19)	CB2
R	MLG GND SENSE (L8)	CB2
R	PROXIMITY SWITCH 2 (H3)	CB3
R	PROXIMITY SWITCH 3 (H4)	CB3
R	-----	

- R (l) Using steering handwheel, steer nose gear full
R right and full left five times.
- R (m) Readjust T1, T2, and T4 as required to maintain
R cable tension of 45 (± 2.5) lb. Rigpin R2 must fit
R freely and alignment maintained between slot in
R cable drum and roller of disconnect actuator arm.
- R (11) Remove rigpin R2.



MAINTENANCE MANUAL

- R (12) Remove rigpin R1 (Views D and E).
- R (13) Adjust nose gear steering force sensor switch as
R required (Ref. 32-51-16).
- R (14) Adjust nose gear steering cable drum displacement
R switch as required (Ref. 32-51-15).
- R (15) Reconnect torque arms at apex pin.

R B. Test

R NOTE: Steering angle is determined using either the
R steering angle limits scale or by measuring the
R travel of the nose gear steering actuator piston
R (Ref. 32-51-04). The two methods are equally
R accurate. Both methods require zero indexing
R the nose gear strut piston to the nose gear
R strut cylinder as in initial step.

R (1) Verify that hydraulic system C pressure is on (Ref.
R 29-11-00).

R (2) Verify that electrical power is on (Ref. 24-00-00).

R (3) Verify that work stands and personnel are clear of
R rudder control surfaces.

R (4) Aircraft may be resting on the nose gear wheels or
R supported on jacks.

R (a) Aircraft on wheels - verify that torque arms are
R connected.

R NOTE: Surface should be smooth and hard. Greased
R skid plates may be used.

R (b) Aircraft on jacks - disconnect torque arms.

R NOTE: When tests are conducted with torque arms
R disconnected, there may be a tendency for
R the upper torque arm to continue to drift
R beyond the command steering position. If
R this occurs, momentarily reverse the
R command signal to ensure that the steering
R valve is nulled.

R (5) If used, verify that steering angle limits scale is
R correctly positioned (Ref. 32-51-04).

R (6) Verify that LANDING GEAR control lever is in DOWN
R position.

R EFFECTIVITY: ALL

001B

32-51-00
Page 512
Mar 15/84

LOCKHEED
MAINTENANCE MANUAL

R	(7) Verify that following circuit breakers are closed:	
R		
R		
R	CIRCUIT BREAKER	LOCATION
R		
R	PROX SW PWR NO. 1 (L10)	CB1
R	PROX SW PWR NO. 4 (L11)	CB1
R	GEAR CONT. NO. 1 (F17)	CB2
R	GEAR CONT. NO. 2 (F18)	CB2
R	NOSE STEERING (F19)	CB2
R	MLG GND SENSE (L8)	CB2
R	PROXIMITY SWITCH 2 (H3)	CB3
R	PROXIMITY SWITCH 3 (H4)	CB3
R		
R	(8) Verify that nose gear steering hydraulic servo valve centering pin C (Fig. 502, View G) is not installed and that there are no rigpins installed in nose gear steering system.	
R		
R	(9) Using steering handwheel, steer nose gear full right and full left five times while observing that all system interrelated parts are functioning and not binding or interfering with adjacent equipment or structure.	
R		
R	(10) Using rudder pedals, exercise the steering system as follows (return rudder pedals to neutral after each cycle): full right and left, two cycles; 3/4 right and left, one cycle; 1/2 right and left, one cycle; and 1/4 right and left, one cycle.	
R		
R	(11) Verify that system rigging has not changed as follows:	
R	(a) Install rigpin R2 in handwheel input cable drum assembly. Pin must install freely and must not cause steering system to move.	
R		
R	(b) Install rigpin R1 in left rudder linkage; pin must install freely and must not cause steering system to move.	
R		
R	(c) On Flight Engineer/Second Officers overhead circuit breaker panel CB2 open and close circuit breaker GEAR - NOSE STEERING (F19) while observing operation of rudder pedal disconnect actuator.	
R		

R EFFECTIVITY: ALL

001B

32-51-00
Page 513
Mar 15/84



MAINTENANCE MANUAL

Actuator roller must disengage and engage without moving steering system.

- (d) Verify that circuit breaker actuated in Step (c) is closed.
 - (e) Remove rigpin R1.
 - (f) Install centering pin C. Pin must install freely and must not cause steering system to move.
 - (g) Remove rigpin R2 and centering pin C.
 - (h) Nose gear steering system must remain positioned at $0(\pm 1)$ degrees while performing steps (a) through (g). If steering system position does not remain within limits, the system must be rerigged in accordance with Step A(10).
- (12) Station an observer where rudder pedal steering disconnect actuator operation can be verified and perform the following:
- (a) Push rudder pedal to full left rudder position. Note and mark steering handwheel position. Return rudder pedals to neutral position. Actuator must remain engaged (arm up) throughout rudder pedal travel.
 - (b) Repeat for full right rudder position. Results must be the same.
 - (c) On aircraft 001-031 without SB32-094, rotate steering handwheel counterclockwise to marked handwheel position. Continue to rotate handwheel in small increments; release handwheel at each increment. When handwheel is released, actuator must engage until nose gear position reaches 14 degrees. Beyond this position, actuator must remain disengaged when handwheel is released.
- R
- (c) On aircraft 001-031 with SB32-094, and 032-999, rotate steering handwheel counterclockwise to marked handwheel position. Continue to rotate handwheel in small increments; release handwheel at each increment. When handwheel is released, actuator must engage until nose gear position reaches $16(\pm 2)$ degrees. Note position. Beyond this position, actuator must remain disengaged when handwheel is released. Nose gear steering position angles are determined as follows:

EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL

R • With nose gear centered (± 0 degree), measure and
R record length of both steering actuator rods from
R gland nut face to centerline of rod-end thru-bolt.

R • When nose wheel has rotated to steering wheel
R position, measure length of extending actuator
R (left actuator for right turns, right actuator for
R left turns).

R • Determine difference in actuator rod length
R (measured on same actuator). Difference in length
R must conform as follows:

	STEERING WHEEL POSITION ANGLE IN DEGREES	ACTUATOR ROD LENGTH DIFFERENTIAL IN INCHES
R	0 (± 1)	0 to 0.09
R	Full Rudder Pedal	0.93 to 1.40*
R	Steering 10 ($+3$, -1)	1.04 to 1.83**
R	Switch cutout	1.50 to 2.09
R	open 16 (± 2)	
R	Full steering wheel	7.94 to 8.43
R	position 65 (± 2)	

R *Aircraft on the ground with torque links connected.
R **Aircraft off the ground with torque links disconnected.
R

R (d) Continue to rotate and release steering handwheel
R at approximately 10-degree increments to stop.
R Actuator must remain disengaged at all points.

R (e) Return steering handwheel to center (0-degree)
R position.

R (f) Repeat Steps (c), (d), and (e) for clockwise
R rotation.

R (g) On Flight Engineer/Second Officers aft circuit
R breaker panel CB3 open RAT MAN DEPLOY (B14) and
R RAT AUTO DEPLOY (L3) circuit breakers, and verify
R that RAT ground safety lock is installed (Ref.
R 29-21-00). Shade NLG air/ground safety sensor
R with aluminum artificial target (Ref. 20-31-01).

R (h) Push left rudder pedal to full left rudder
R position and hold.

R EFFECTIVITY: ALL
R
001B

32-51-00
Page 515
Mar 15/84



R

- (i) Remove aluminum strip from air/ground safety sensor. Actuator must engage and cause handwheel to rotate to 10 (3, -1) degree position as measured on the nose gear.
 - (j) Return rudder pedals to neutral position. Nose gear must return to 0 (± 2) degree position.
 - (k) Repeat Steps (g) through (j) for full right rudder position.
- (13) Using force gage, apply increasing force to each rudder pedal and observe indication on force gage at moment rudder pedal begins to move. This breakout force must not exceed 20.45 lb.
- (14) Rig pull scale on steering handwheel such that scale will read at position tangent to periphery. Apply increasing force and observe scale indication at moment wheel begins to move. This breakout force must not exceed 9.8 lb.
- (15) Push rudder pedals alternately stop-to-stop. Nose gear steering angle must be 10 (+3, -1) degrees each side.
- NOTE: If nose gear steering limits cannot be obtained, perform rudder pedal steering mechanism adjustment and test (Ref. 32-51-04).
- (16) Rotate steering handwheel stop-to-stop. Nose gear steering angle must be 65 (± 2) degrees each side.
- (17) Insert rigpin in cable drum assembly (Ref. Fig. 502, View F).
- (18) Using force gage, apply increasing force to each rudder pedal individually and observe force gage indication at moment rudder begins to move. Breakout force must be less than 21 lb.
- (19) Push each rudder pedal fully. Rudder pedals must move a minimum of 3.4 inches.
- (20) Remove rigpin from cable drum.
- (21) Turn off hydraulic system C pressure as required (Ref. 29-11-00).
- (22) Turn off electrical power as required (Ref. 24-00-00).
- (23) Install conduit guard (when applicable) as follows:

EFFECTIVITY: ALL

001B

32-51-00
Page 516
Jun 15/96

LOCKHEED



MAINTENANCE MANUAL

- R (a) Position guard in place and secure with nuts (Ref. R Fig. 501).
- R (b) Safety nuts with cotter pins.
- R (c) Install conduit clamp.
- R (d) Install conduit bracket.
- R (e) Connect conduit connector.
- R (f) Remove tags and close connector opened in Step R A(4)(e).
- R (24) Perform weight and balance system test (Ref. 31-41-00).

R EFFECTIVITY: ALL
R
001B

32-51-00
Page 517/518
Mar 15/84

LOCKHEED
MAINTENANCE MANUAL

R NOSE_GEAR_STEERING_SYSTEM_-_CLEANING_AND_PAINTING

R 1. General

R This procedure contains instructions for cleaning and painting
R the turn limit marks on the nose landing gear conduit guard
R bracket.

R 2. Equipment_and_Materials

R Polyurethane Gloss, Lockheed Specification C37-1103, Type III,
R color code LAC 2503A, or equivalent. Commercial equivalent,
R Sterling Lacquer Mfg. Co., No. U-(series) yellow-orange

R 3. Referenced_Procedure

R 20-51-11 Application of Exterior Coating System For the
R L-1011 Aircraft - PB78-433B - Maintenance Practices

R 4. Cleaning/Painting

R A. Cleaning

R (1) Clean and prepare surface to be painted (Ref.
R 20-51-11).

R (2) Mask areas adjacent to surfaces to be painted (Ref.
R Fig. 701).

R B. Painting

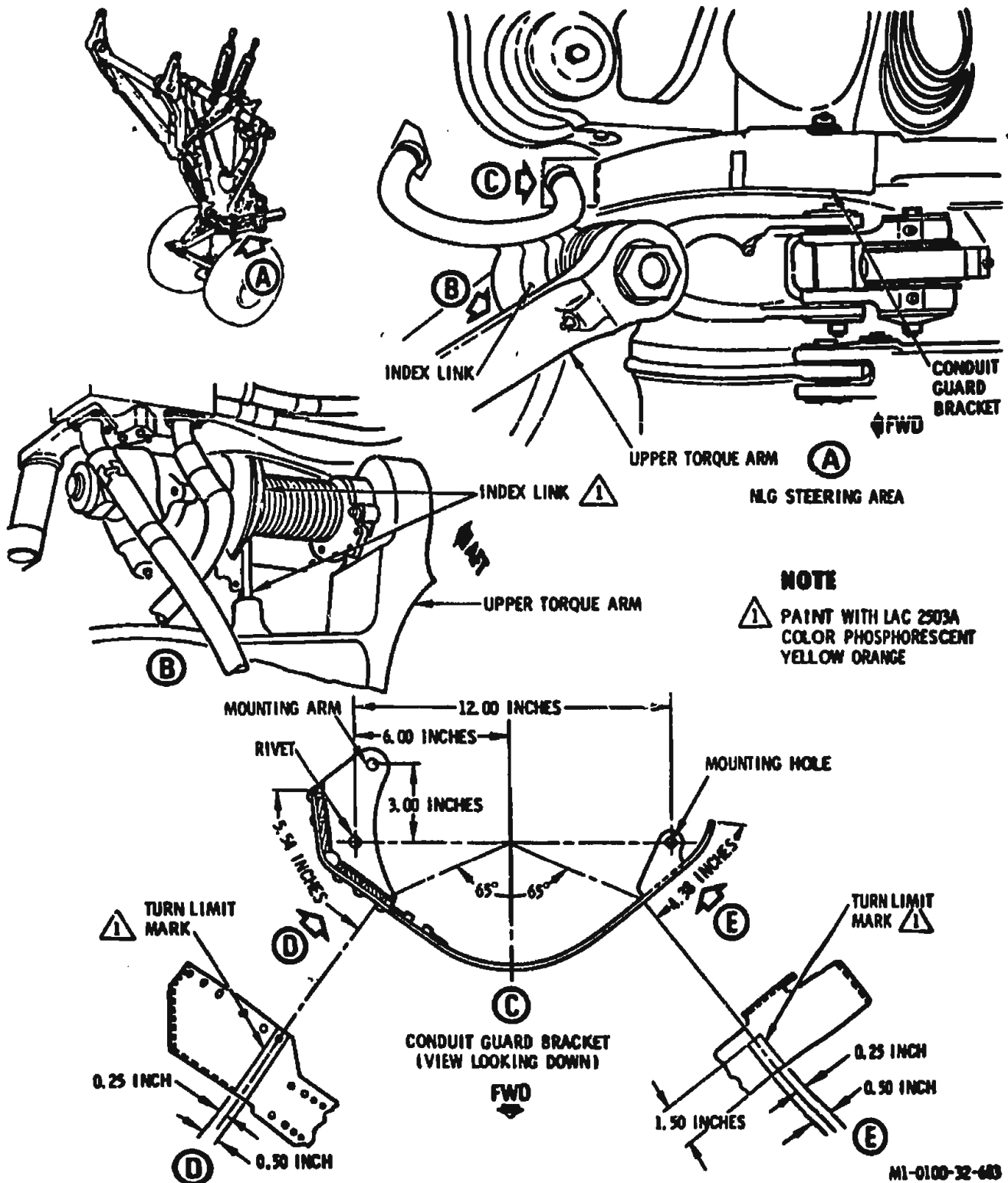
R (1) Apply one coat of polyurethane gloss to masked areas of
R conduit guard bracket.

R (2) Air dry 5 hours minimum.

R EFFECTIVITY: ALL
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001B

32-51-00
Page 701
May 15/77

LOCKHEED
MAINTENANCE MANUAL



Turn Limit Mark Painting
Figure 701

EFFECTIVITY: ALL

32-51-00
Page 702
May 15/77

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001B

**NOSE LANDING GEAR STEERING ACTUATOR - REMOVAL AND INSTALLATION****1. General**

This procedure is for removal and installation of the left steering actuator. Removal and installation procedure for the right steering actuator is identical, except that the nosewheel must be turned left to expose the right actuator connecting rod end.

When removing both actuators, remove one actuator following the procedure below; then rotate the steering collar to expose the second actuator rod end by using the upper torque arm for leverage. The torque arm apex pin must be removed to rotate the steering collar in this manner.

2. Equipment and Materials

Spanner wrench

Protective caps and plugs

Bucket (2-gallon minimum)

Lock-wire, Fed Spec QQ-W-390, 0.047-inch diameter, or equivalent

R Grease, Ref. MM 12-20-00, Lubrication, Scheduled Servicing

Methyl-ethyl-ketone (MEK)

Corrosion-preventive compound, MIL-C-16173, Grade 4 or equivalent

Sealing Compound, Lockheed Material Spec LCM40-2180, Type I or equivalent

Protective coating, Finch Paint and Chemical Co. clear epoxy 473-20, or Deft Inc. clear epoxy 01-X-20, or equivalent

Hydraulic Fluid, LAC Spec C-34-1224, Type III, or equivalent

3. Referenced Procedures

29-11-00 Hydraulic Power System - Maintenance Practices

32-51-00 Nose Landing Gear Steering System - Adjustment and Test

EFFECTIVITY: ALL

001B

32-51-02
Page 401
Dec 15/93

LOCKHEED
MAINTENANCE MANUAL

4. Removal/Installation

A. Removal

- (1) Install landing gear downlock safety pins.
- (2) Remove torque arm apex pin.
- (3) Verify hydraulic system C pressure is at 0 psi.
- (4) Using the upper torque arm for leverage, rotate the steering collar to the right until clearance exists to remove the steering actuator to steering collar attachment pin (Ref. Fig. 401).
- (5) Remove nut, washer, cap, and actuator attach pin lockbolt.
- (6) Remove bolt, washer, and actuator attach pin.
- (7) Bleed hydraulic pressure by opening two bleed valves on steering control valve.
- (8) Remove nut and washer from steering actuator (Ref. Fig. 402).
- (9) Pull out steering actuator cylinder from trunnion.

B. Installation

- (1) Inspect actuator-to-trunnion packing and backup rings. Replace if necessary.
- (2) Attach steering actuator cylinder to trunnion as follows.
 - (a) Lubricate packings and backup rings with hydraulic fluid.
 - (b) Properly align hydraulic transfer tube with ports in trunnion and cylinder. Insert cylinder through trunnion.
 - (c) Install washer on cylinder.

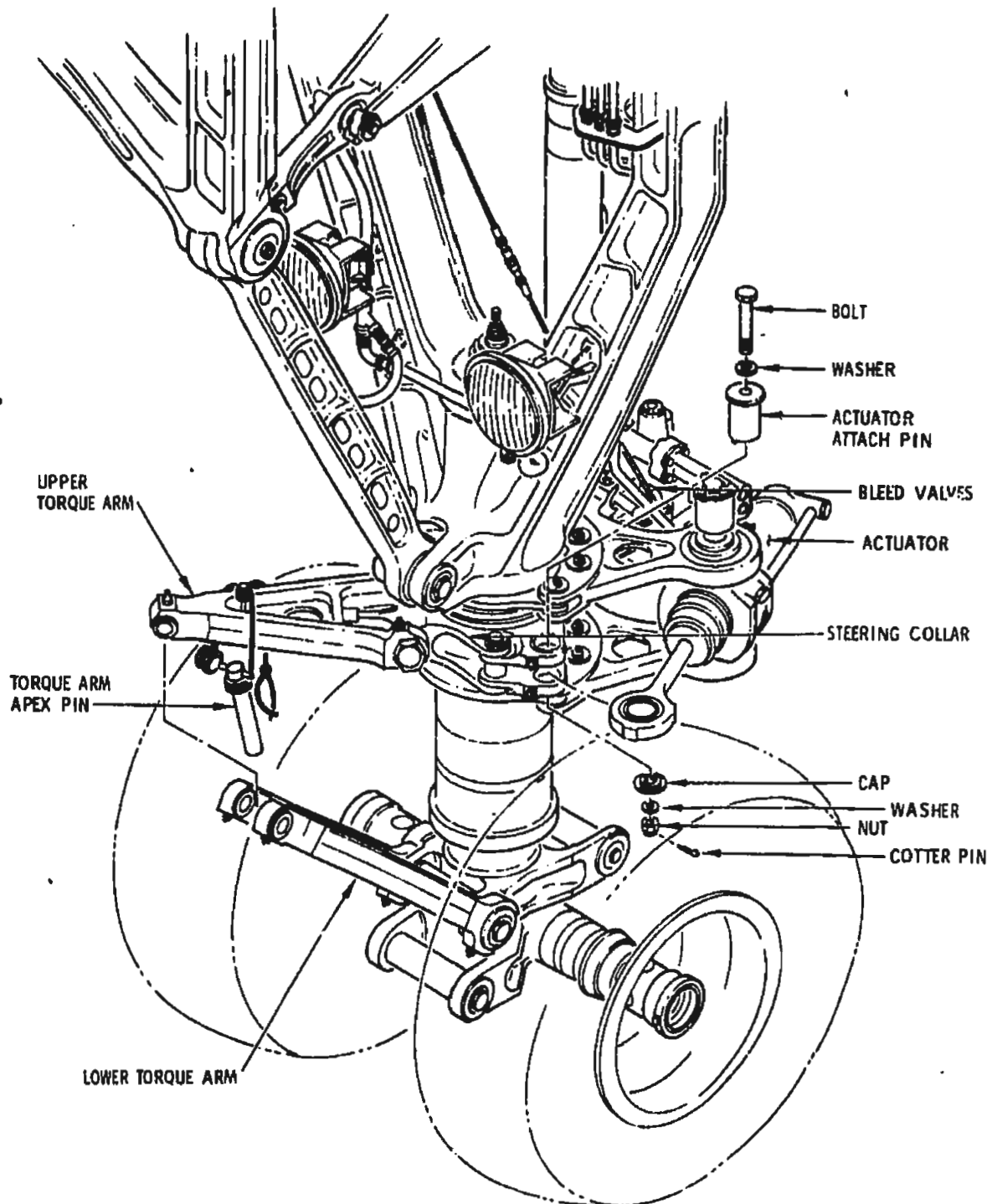
WARNING: USE CLEANING MATERIALS IN A WELL-VENTILATED AREA. DO NOT INHALE VAPORS OR ALLOW CLEANING MATERIALS TO CONTACT SKIN. KEEP CLEANING MATERIALS AWAY FROM OPEN FLAME AND OTHER IGNITION SOURCES.

EFFECTIVITY: ALL

001B

32-51-02
Page 402
Nov 15/86

LOCKHEED
MAINTENANCE MANUAL



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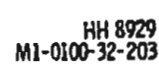
R **Nose Landing Gear Steering Actuator - Removal and Installation**
R **Figure 401 (Sheet 1)**

EFFECTIVITY: ALL

32-51-02
Page 403
Feb 15/74

001B

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32-51-02
Page 404
Dec 1/72

001B

LOCKHEED
MAINTENANCE MANUAL

R
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- (d) Clean threads of nut and cylinder by wiping surfaces with clean lint-free cloth dampened with methyl-ethyl-ketone. Before MEK air-dries, wipe surfaces dry with clean dry cloth.

R
R

- (e) Apply a brush coat of corrosion-preventive compound to threads of nut and cylinder.

R
R
R
R

- (f) Install nut and tighten until cylinder butts against land of trunnion. Torque nut 150 (± 25) lb ft. Remove excess corrosion-preventive compound with clean dry cloth.

R
R

- (g) Secure nut to cylinder with lock-wire in two places.

R
R
R
R

- (h) Fillet seal entire circumference of parting lines between nut and cylinder, nut and washer, washer and trunnion, trunnion and cylinder with sealing compound.

R
R

- (i) Mix protective coating material in accordance with manufacturer's instructions.

R
R
R

NOTE: Allow 1/2-hour minimum drying time before applying protective coating over sealing compound.

R
R
R
R
R
R

- (j) Brush protective coating onto surfaces of nut, washer, trunnion, and cylinder ensuring that sealing compound is completely covered. Apply protective coating to obtain a dry film thickness of 0.5 to 1.0 mil. Coating should overlap adjacent area by 1/4-inch.

R
R
R
R

- (k) Allow protective coating to dry for 1/2 hour. Determine that coating is free of pinholes, bubbles, voids, or orange skin appearance and adheres completely to surfaces.

R
R
R
R
R

- (l) Air-dry protective coating for 24 hours at 70 degrees Fahrenheit (21 degrees Centigrade) minimum or air-dry for 1 hour followed by 4 hours at 120 to 150 degrees Fahrenheit (49 to 66 degrees Centigrade).

R
R

NOTE: Drying process must be complete before exposing actuator to hydraulic fluid.

R
R

- (3) Insert actuator attach pin, washer, and actuator attach pin lockbolt.

EFFECTIVITY: ALL

001B

32-51-02
Page 405
Nov 15/86

LOCKHEED
MAINTENANCE MANUAL

- R (4) Install spacer, washer, cap, nut, and cotter pin.
- R (5) Turn on hydraulic system C pressure (Ref. 29-11-00).
- R (6) Bleed hydraulic system through two bleed valves on
R steering control valve.
- R (7) Join upper and lower torque arms at apex and install
R apex pin.
- R (8) Check for full right and left steering travel by
R carefully actuating ground operation lever (Ref.
R 32-51-00).
- R (9) Turn off hydraulic system C pressure (Ref. 29-11-00).

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001B

EFFECTIVITY: ALL

32-51-02
Page 406
Nov 15/86

LOCKHEED
MAINTENANCE MANUAL

NOSE GEAR STEERING RUDDER PEDAL DISCONNECT ACTUATOR
MAINTENANCE PRACTICES

1. General

C The nose gear steering, rudder pedal disconnect actuator, when
C inoperative, can be in either of two conditions. The actuator
C may be disengaged (rudder pedal steering disconnected), or
C engaged (rudder pedal steering connected). Actuator must be
C deactivated as follows prior to aircraft dispatch.

2. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.032-inch diameter, or equivalent

3. Referenced Procedure

32-51-03 Nose Gear Steering Rudder Pedal Disconnect Actuator
 - Removal and Installation

4. Maintenance Practices

A. Deactivation of Disengaged Actuator

NOTE: This deactivation procedure applies only when an aircraft is to be dispatched in accordance with the MEL.

- (1) On Flight Engineer/Second Officers circuit breaker panel CB2, open and collar GEAR NOSE STEERING (F19) circuit breaker.
- (2) Place placard in flight station for circuit breaker opened in Step (1) to prevent operation.
- (3) Make appropriate entry in aircraft log book.

B. Deactivation of Engaged Actuator

NOTE: This deactivation procedure applies only when an aircraft is to be dispatched in accordance with the MEL.

Normally the actuator is deactivated by removing the disengage arm assembly as called out in Steps (1) through (7). An alternate method is to remove the actuator (Ref. 32-51-03).

R EFFECTIVITY: ALL
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001B

32-51-03
Page 201
Jul 15/84



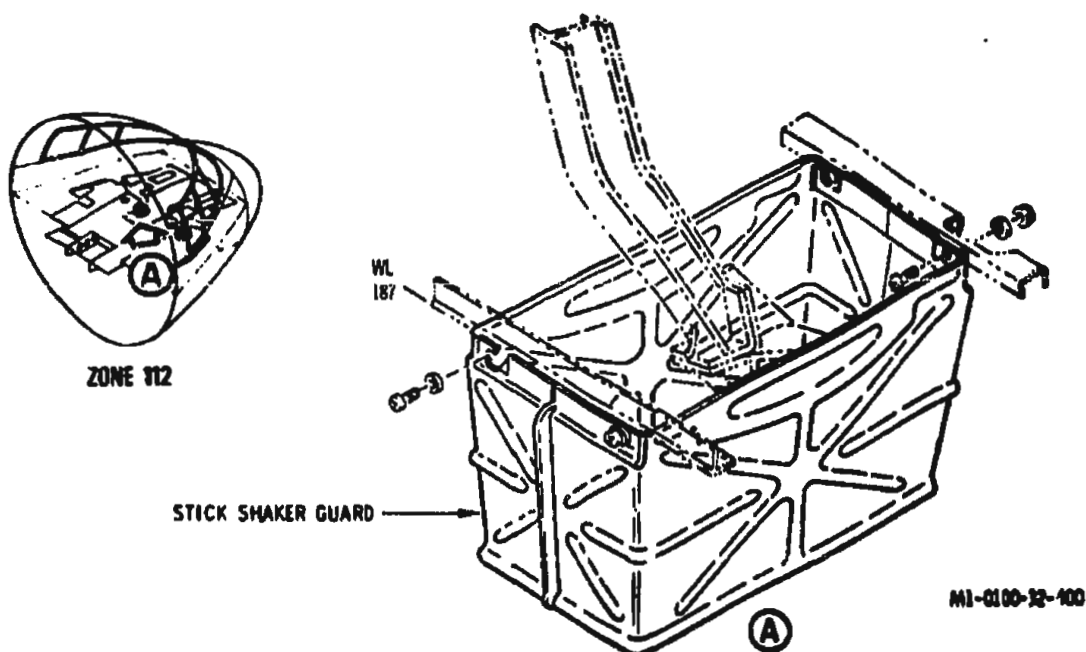
MAINTENANCE MANUAL

- (1) On Flight Engineer/Second Officers circuit breaker panel CB2, open and collar GEAR NOSE STEERING (F19) circuit breaker.
- (2) In forward electronic service center (zone 112), remove stick shaker guard (Ref. Fig. 201).
- (3) Cut lock-wire safetying nut to actuator shaft (Ref. Fig. 202). Loosen nut until spring is relaxed enough to permit lock-wire to pass between coils.
- (4) Using a required length of lock-wire, tie disengage spring coil in two opposite places to prevent spring extension. Use two wraps of lock-wire.

R

WARNING: THE DISENGAGE SPRING IS PRELOADED TO 55 LB. EXERCISE CARE WHEN REMOVING NUT.

- (5) Hold disengage arm; then remove nut and washer.
- (6) Remove disengage arm assembly.
- (7) Install stick shaker guard.
- (8) Place placard in flight station for circuit breaker opened in Step (1).



M1-0100-12-100

Stick Shaker Guard - Removal and Installation
Figure 201

EFFECTIVITY: ALL

001B

32-51-03
Page 202
Aug 15/81

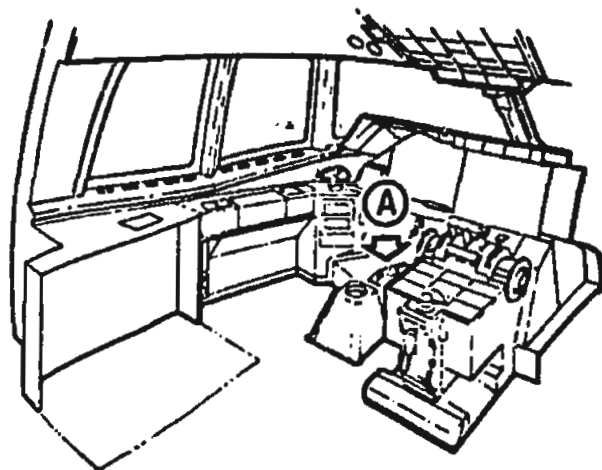
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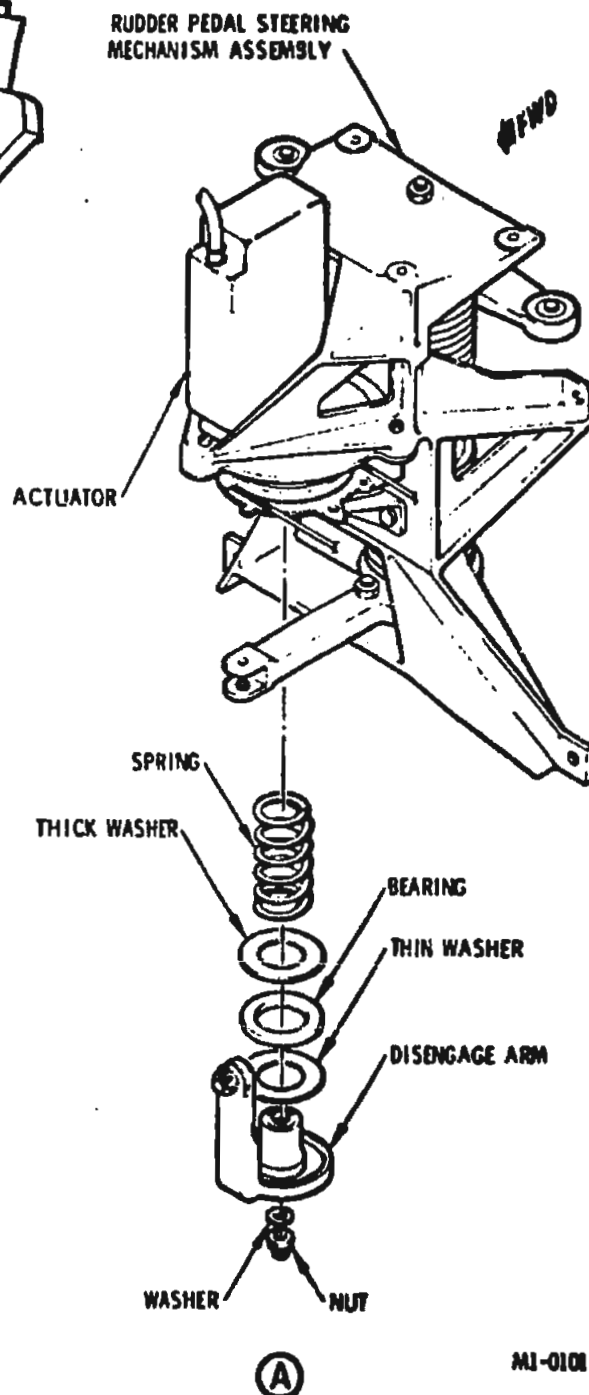
MAINTENANCE MANUAL

(9) Make appropriate entry in aircraft log book.

LOCKHEED
MAINTENANCE MANUAL



FLIGHT STATION
ZONE 211



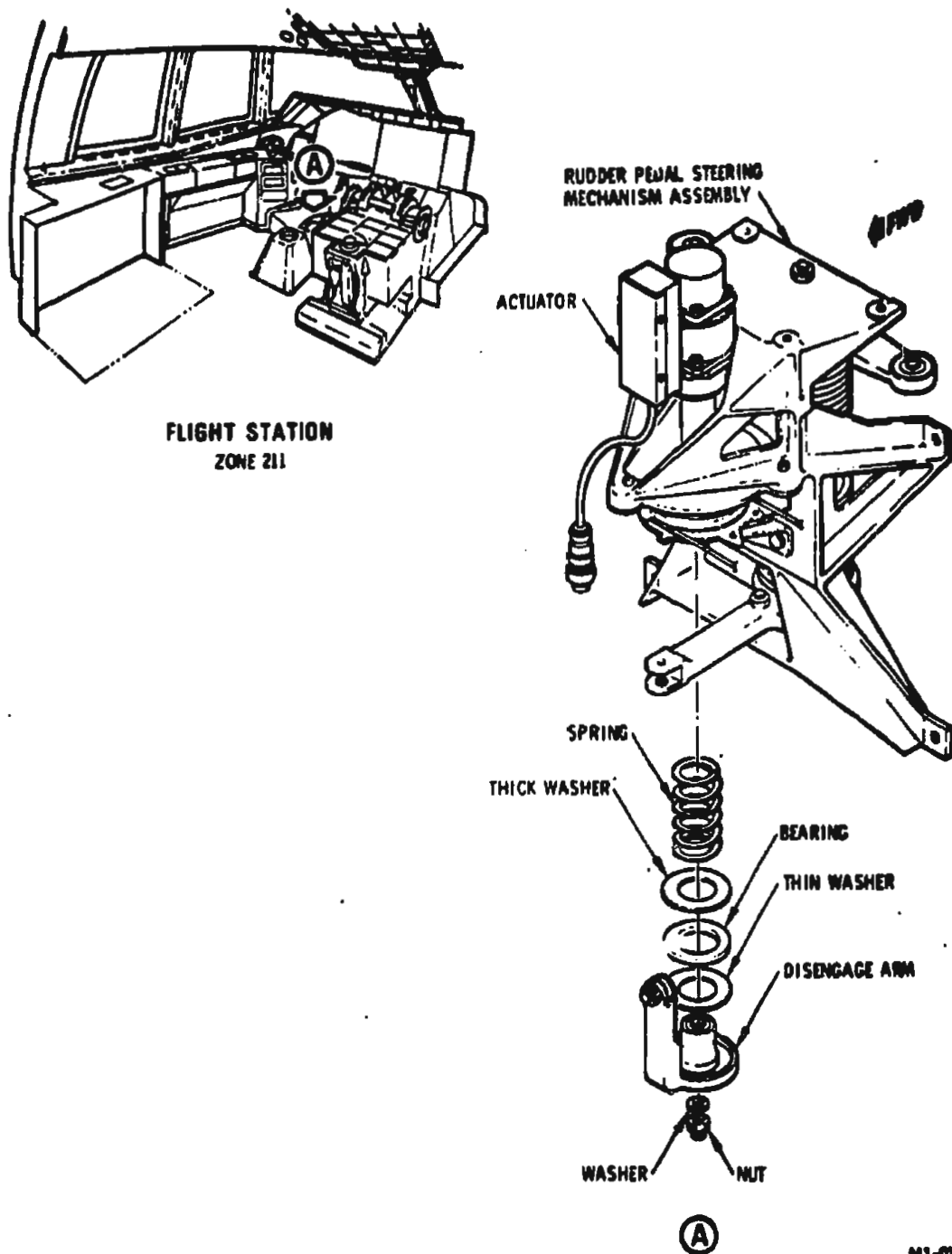
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Nose Gear Steering Rudder Pedal Disconnect Actuator Deactivation
Figure 202

0018 EFFECTIVITY: 001-031 WITHOUT SB32-137

32-51-03
Page 204
Mar 15/81

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-015

Nose Gear Steering Rudder Pedal Disconnect Actuator Deactivation
Figure 202

R EFFECTIVITY: 001-031 WITH SB32-137 AND 032-999
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001B

32-51-03
Page 205/206
Jul 15/84



**NOSE GEAR STEERING RUDDER PEDAL DISCONNECT ACTUATOR
REMOVAL AND INSTALLATION**

1. Equipment and Materials

Lock-wire, QQ-W-390, 0.020-inch diameter, or equivalent

Lock-wire, QQ-2-390, 0.032-inch diameter, or equivalent

2. Referenced Procedures

- | | |
|----------|--|
| 24-00-00 | Electrical Power - Maintenance Practices |
| 25-11-01 | Captains Seat Assembly - Removal and Installation |
| 25-13-06 | Rudder Pedal Trim Cover - Removal and Installation |
| 29-11-00 | Hydraulic Power System - Maintenance Practices |
| 32-51-15 | Nose Gear Steering Cable Drum Displacement Switch -
Adjustment and Test |

3. Removal/Installation

A. Removal

- (1) Remove Captains seat assembly (Ref. 25-11-01).
- (2) Remove rudder pedal trim cover (Ref. 25-13-06).
- (3) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, open and tag NOSE STEERING (F19) circuit breaker.
- (4) In forward electronic service center (zone 112), remove stick shaker guard (Ref. Fig. 401).
- (5) Cut lock-wire safetying nut to actuator shaft (Ref. Fig. 403).

WARNING: THE DISENGAGE SPRING IS PRELOADED TO 55 LB.
EXERCISE CARE WHEN REMOVING NUT.

- (6) Using required length of 0.032-inch diameter lock-wire, tie disengage spring coil in two opposite places to prevent spring extension. Use two wraps of lock-wire.

EFFECTIVITY: ALL



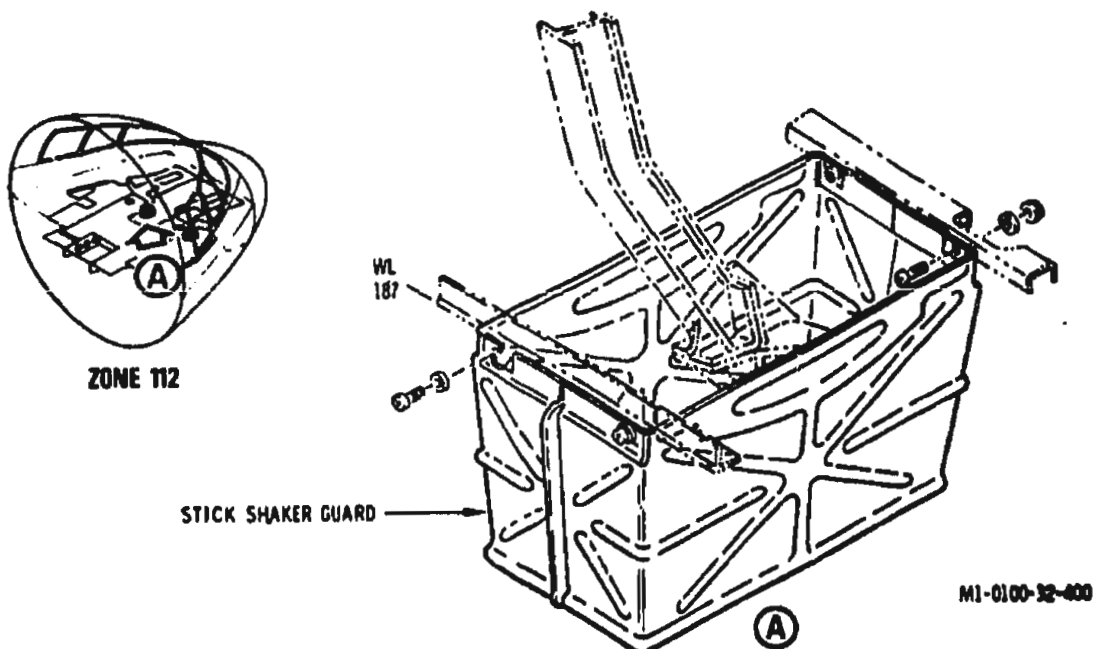
- (7) Hold arm assembly and disengage spring, then remove nut.
- (8) Remove disengage assembly. Retract actuator shaft manually.
- (9) At flight station (zone 210) move rudder pedals to full forward position.
- (10) Remove three bolts securing actuator.
- (11) Disconnect electrical connector.
- (12) Remove actuator.

B. Installation

- (1) Verify that circuit breaker opened in Step 3A(3) is open and tagged.

CAUTION: ENSURE THAT CENTER ROLLER OF RUDDER PEDAL STEERING MECHANISM IS ENGAGED IN DRIVER SLOT (REF. FIG. 404).

- (2) Install actuator.



M1-0100-32-400

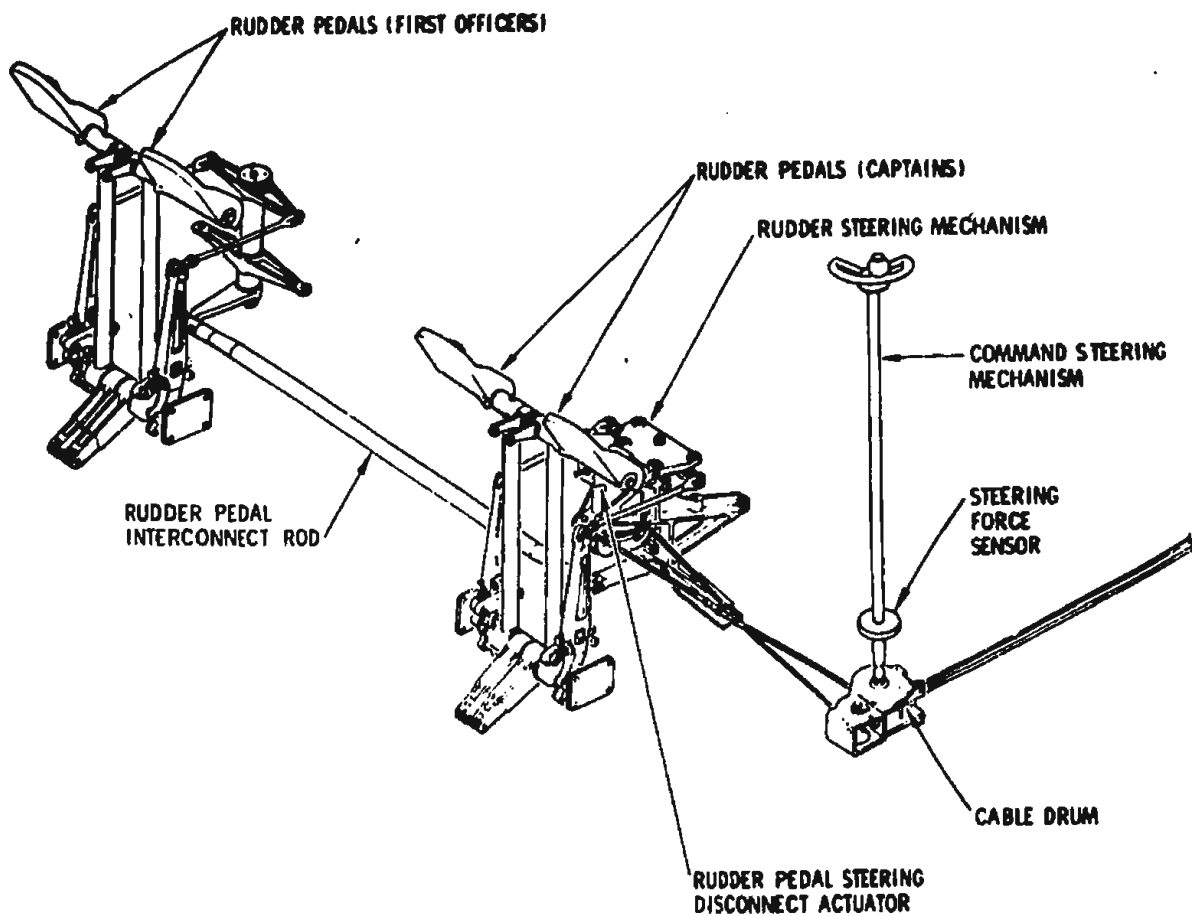
Stick Shaker Guard - Removal and Installation
Figure 401

EFFECTIVITY: ALL

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32-51-03
Page 402
Mar. 15/84

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MAINTENANCE MANUAL



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R
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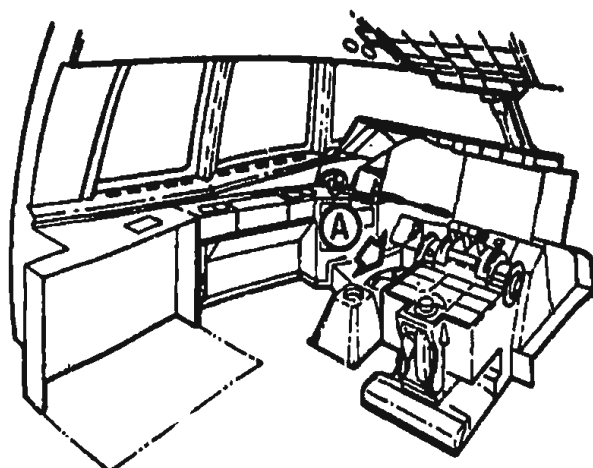
Nose Landing Gear Steering System Component Locator
Figure 402

EFFECTIVITY: ALL

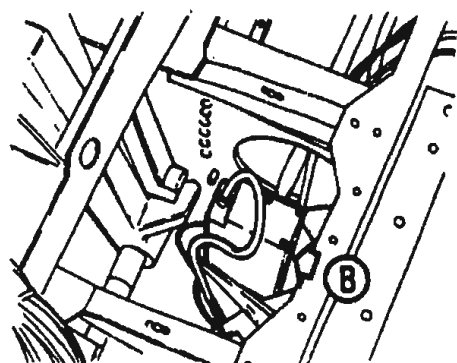
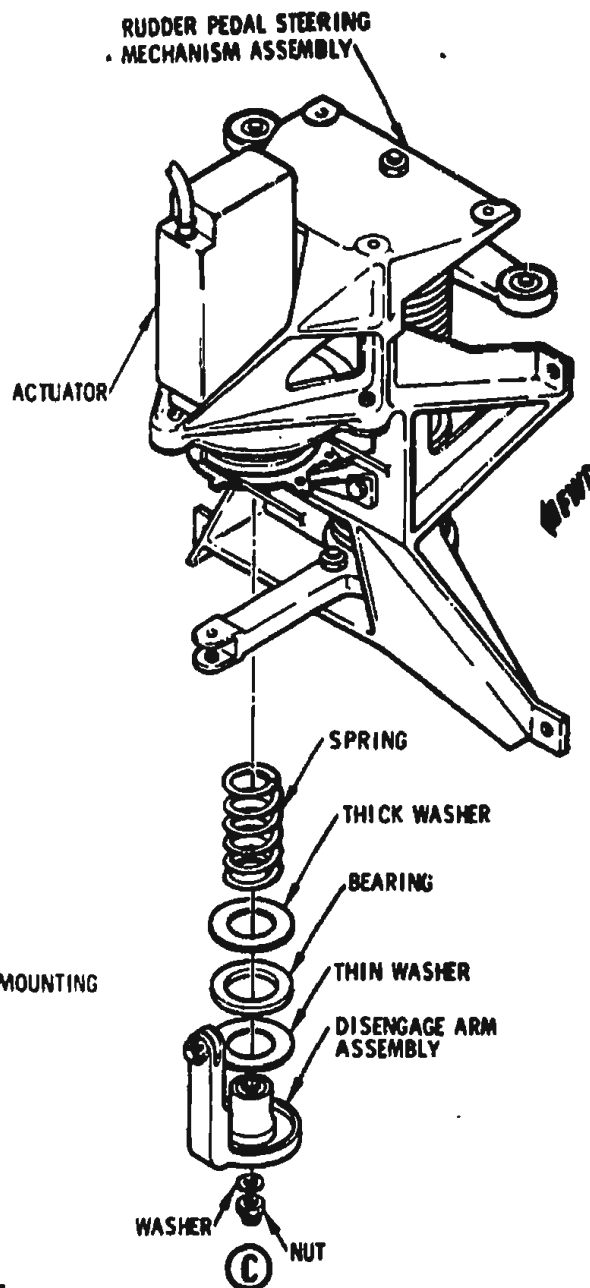
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32-51-03
Page 403
Mar 15/84

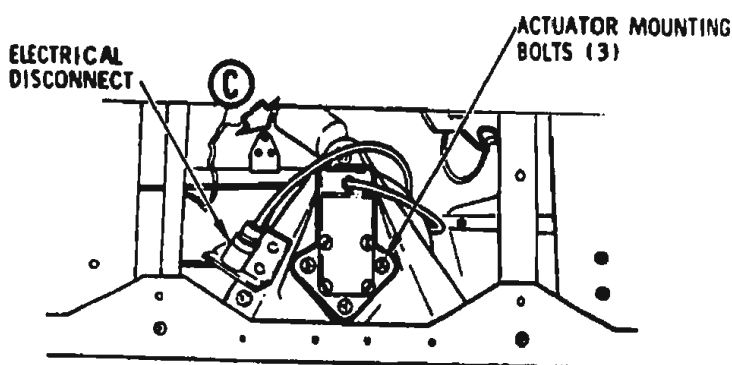
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FLIGHT STATION
ZONE 211



(A) AFWO



(B)

MI-0103-32-287

Nose Gear Steering Rudder Pedal Disconnect Actuator
Removal and Installation
Figure 403

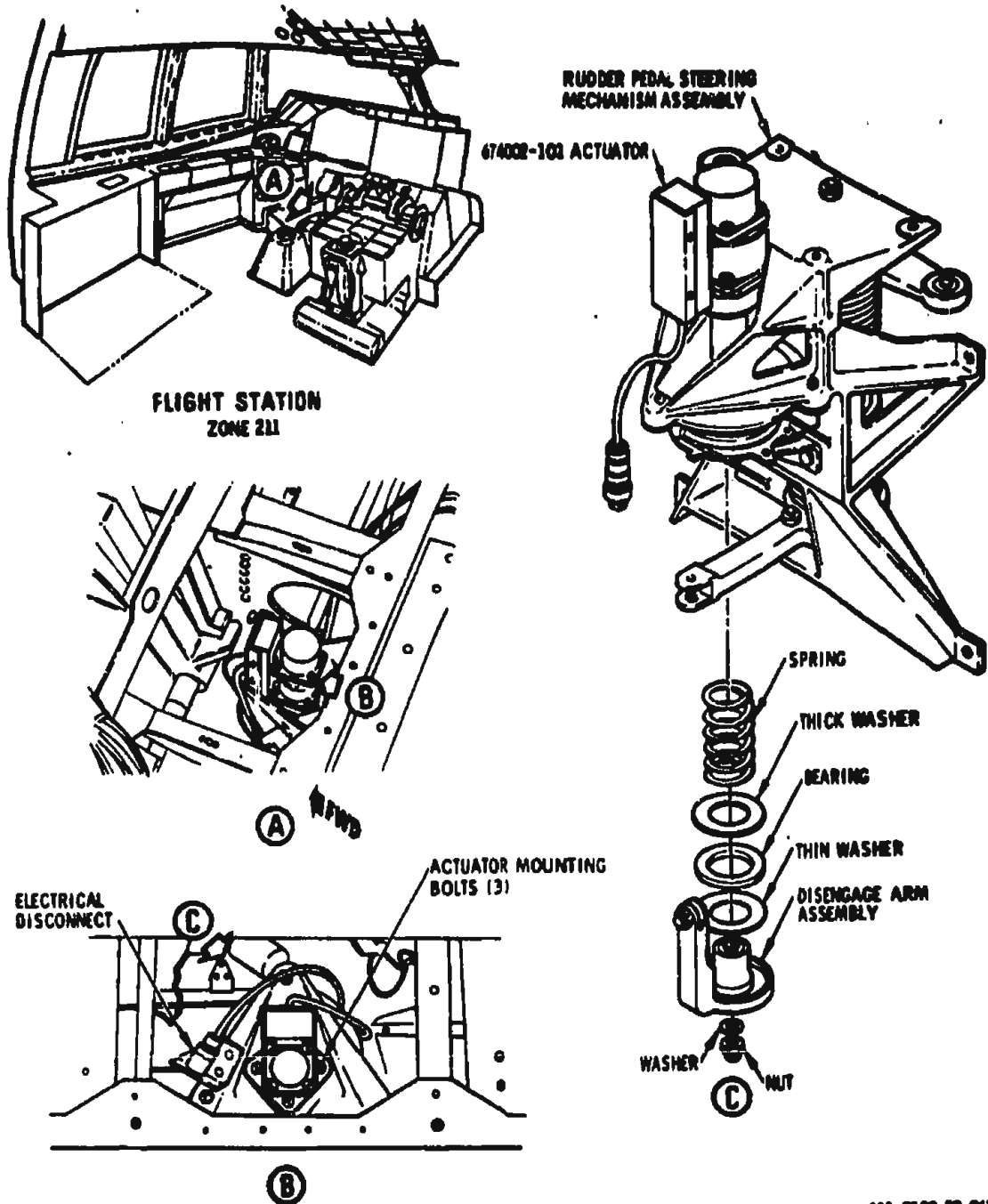
R

EFFECTIVITY: 001-031 WITHOUT SB32-137

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32-51-03
Page 404
Mar 15/84

LOCKHEED
MAINTENANCE MANUAL



M1-0700-32-007

Nose Gear Steering Rudder Pedal Disconnect Actuator
Removal and Installation
Figure 403

R EFFECTIVITY: 001-031 WITH SB32-137 AND 032-999
R
001B

32-51-03
Page 405
Jul. 15/84

LOCKHEED
MAINTENANCE MANUAL

CAUTION: IF REPLACEMENT BOLTS ARE USED, THE BOLTS MUST NOT BE OF GREATER LENGTH THAN ORIGINAL BOLTS; EXCESSIVE LENGTH WILL INTERFERE WITH THE OPERATION OF THE CABLE DRUM.

(3) Install and tighten three bolts securing actuator.

C
C **NOTE:** Use only bolts called out in IPC long bolts may bind cable drum below actuator.

(4) Connect electrical connector.

(5) Compress disengage spring completely and secure in two opposite places with 0.032-inch diameter lock-wire. Do not position lock-wire over end coils of spring. Use two wraps of lock-wire.

(6) Install disengage spring, thrust washer (thick), thrust bearing, thrust washer (thin), arm assembly, washer, and nut.

(7) Ensure that nut has full thread engagement with shaft (shaft showing through nut), then remove lock-wire from spring.

R
R (8) Reconnect rudder pedal interconnect rud (Ref. Fig. 402).

R (9) Turn on electrical power (Ref. 24-00-00).

R (10) Close circuit breaker opened in Step 3A(3).

R (11) Open circuit breaker called out in Step 3A(3).

R (12) Verify that disengagement arm roller is adjacent to flat segment of cable drum cam. Using a feeler gage, measure distance between cam roller and cam. Distance must be 0.015 to 0.025 inch required distance.

R (13) Check adjustment of cable drum displacement switch (Ref. 32-51-15).

C
C **NOTE:** Steps (12) and (14) in 32-51-15 accomplish the
C intent of the check, use of the protractor and
multimeter is required.

R (14) Safety shaft nut with 0.020-inch diameter lock-wire.

NOTE: Nut must be safetied to prevent movement in both directions.

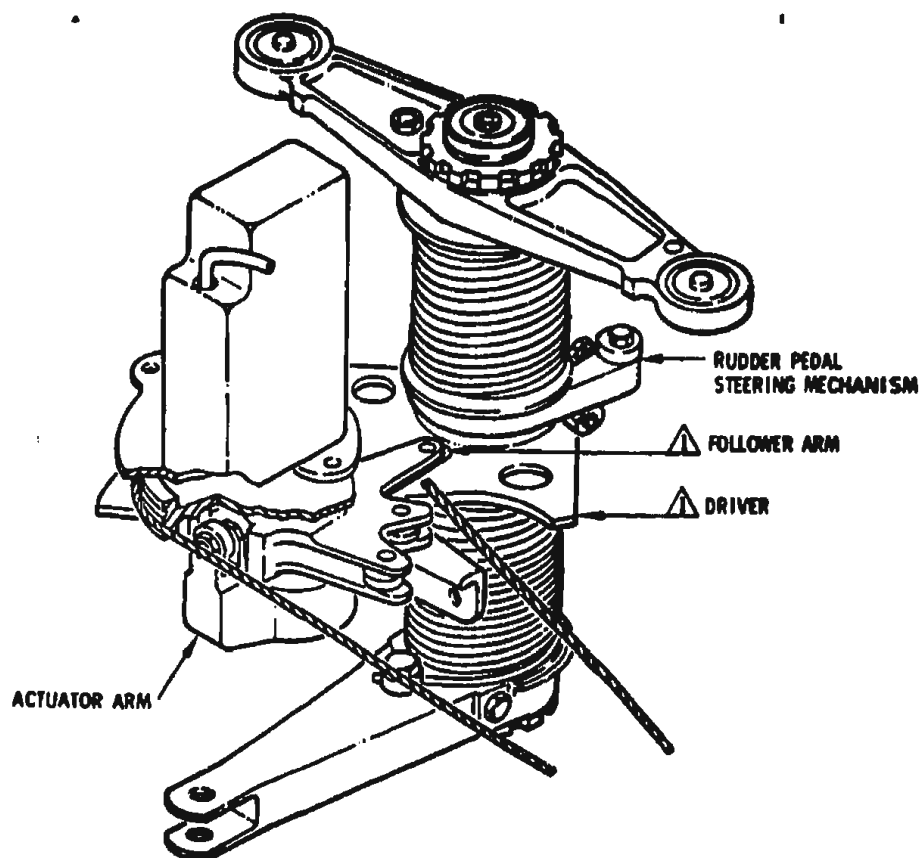
R (15) Install stick shaker guard (Ref. Fig. 401).

EFFECTIVITY: ALL

32-51-03
Page 406
Mar 15/84

001B

LOCKHEED
MAINTENANCE MANUAL



NOTE
⚠ AFTER INSTALLATION OF ACTUATOR AND DISENGAGE ARM, ENSURE THAT CENTER ROLLER OF FOLLOWER IS ENGAGED IN SLOT IN DRIVER.

M1-0101-32-349

Rudder Pedal Steering Mechanism Engagement
Figure 404

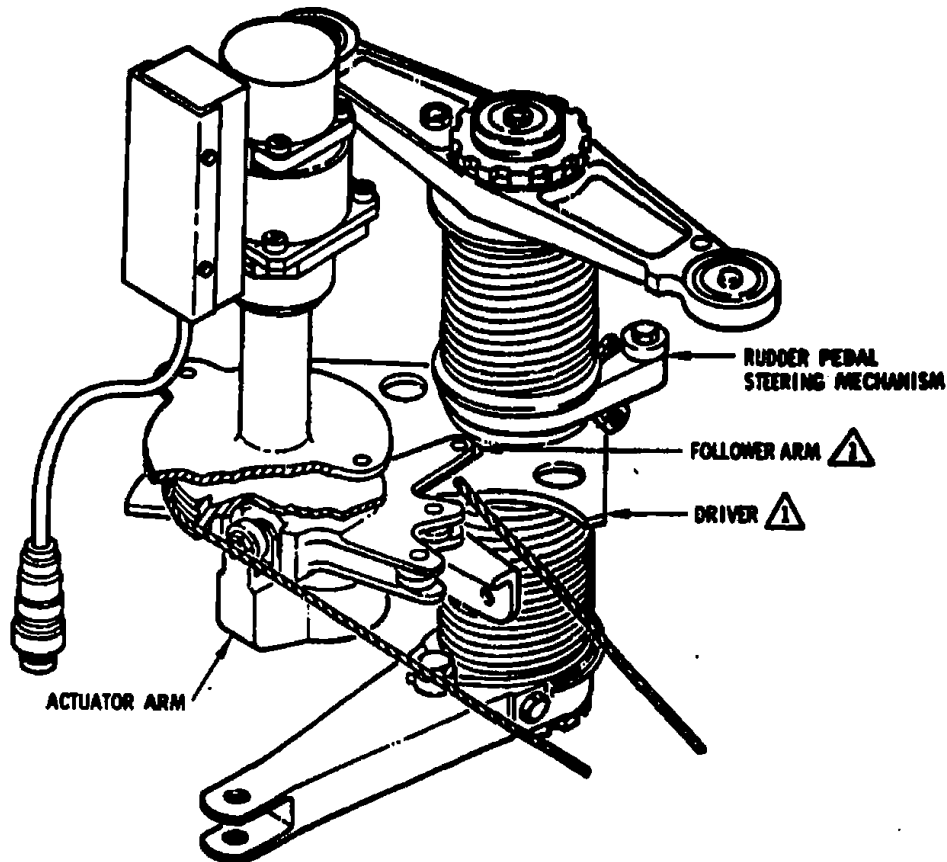
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EFFECTIVITY: 001-031 WITHOUT SB32-137

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32-51-03
Page 407
Mar 15/84

LOCKHEED
MAINTENANCE MANUAL



MI-0100-32-000

Rudder Pedal Steering Mechanism Engagement
Figure 404

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EFFECTIVITY: 001-031 WITH SB32-137 AND 032-999

32-51-03
Page 408
Jul 15/84



- R (16) Remove tag and close circuit breaker opened in Step
R 3A(3).
- R (17) Install rudder pedal trim cover.
- R (18) Install Captains seat assembly (Ref. 25-11-00).

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY
HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY
DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL
FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL
AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT
HYDRAULIC PRESSURE.

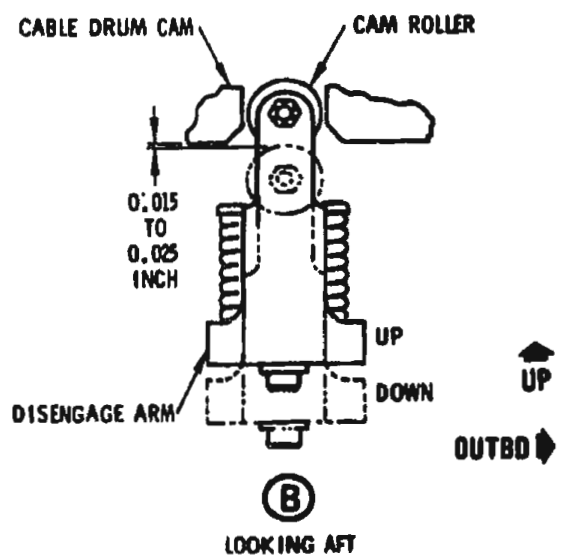
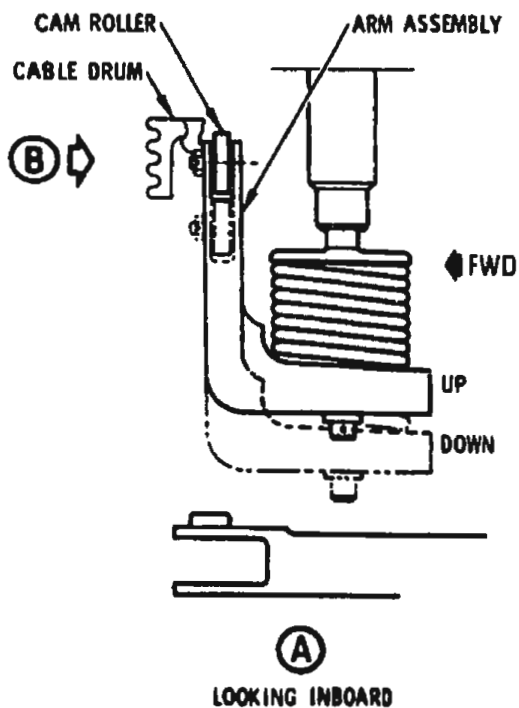
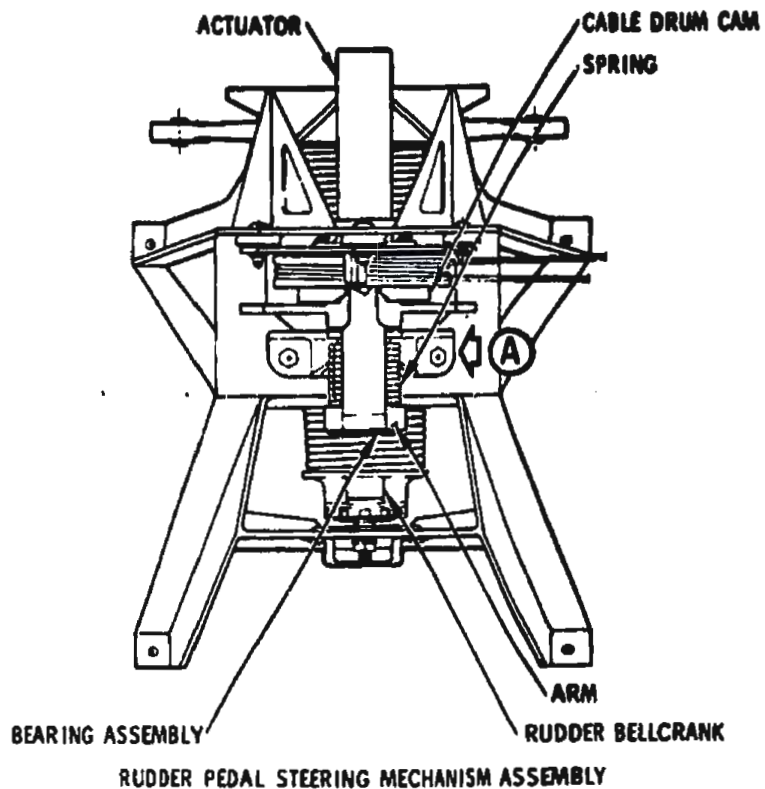
- R (19) Turn on hydraulic system C pressure (Ref. 29-11-00).
R Pressure must be not less than 2400 psi.
- R (20) Aircraft may be resting on nose gear wheels or
supported on jacks.
 - (a) Aircraft on wheels - verify that torque arms are
connected.
 - NOTE:** Surface should be smooth and hard. Greased
skid plates may be used.
 - (b) Aircraft on jacks - disconnect NLG torque arms at
apex and raise upper arm until locked into detent.
 - NOTE:** When tests are conducted with torque arms
disconnected, there may be a tendency for
the upper torque arm to continue to drift
beyond the commanded steering position. If
this occurs, momentarily reverse the
command signal to ensure that the steering
valve is nulled.
- R (21) Hold hand steering wheel in center position and push
R left rudder pedal to full travel.
- R (22) Release hand steering wheel; hand steering wheel must
R turn to 10(+3, -1)-degree position.
- R (23) Repeat Steps (21) and (22) using right rudder pedal.

EFFECTIVITY: ALL

0018

32-51-03
Page 409
Mar 15/84

LOCKHEED
MAINTENANCE MANUAL



MI-1104-32-368

Arm Assembly Adjustment
Figure 405

R

EFFECTIVITY: ALL

001B

32-51-03
Page 410
Mar 15/84

LOCKHEED



MAINTENANCE MANUAL

- R (24) Center rudder pedals; hand steering wheel must return
R to center position.
- R (25) Connect torque arms as required.
- R (26) Turn off hydraulic system C pressure (Ref. 29-11-00).
- R (27) Turn off electrical power (Ref. 24-00-00).

R EFFECTIVITY: ALL
R
001B

32-51-03
Page 411/412
Mar 15/84

RUDDER PEDAL STEERING MECHANISM - REMOVAL AND INSTALLATION**1. Equipment and Materials**

Piano hinge wire, 1/16-inch diameter, 14 inches long, or equivalent

R Pull-wire, Six feet long

Bungee, 1/4-inch diameter, 6 feet long, or equivalent

Cotter Pin, MS 24665-153, or equivalent

2. Referenced Procedures

22-17-16 Stick Shaker - Removal and Installation

23-51-09 Headset Stowage and Microphone Selector Console Assembly - Removal and Installation

25-11-01 Captains Seat Assembly - Removal and Installation

25-11-04 First Observers Seat Assembly - Removal and Installation

25-13-06 Rudder Pedal Trim Cover - Removal and Installation

32-51-00 Nose Gear Steering System - Adjustment and Test

34-22-04 Directional Gyro - Removal and Installation

53-22-01 Flight Station Floor Panels - Removal and Installation

3. Removal/Installation**A. Removal**

- (1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker GEAR NOSE STEERING (F19),
- (2) Remove Captains seat assembly (Ref. 25-11-01).
- (3) Remove rudder pedal trim cover (Ref. 25-13-06).
- (4) Remove screws securing control column shield to control column and remove both halves of shield.

EFFECTIVITY: ALL

32-51-04

Page 401
Nov 15/75

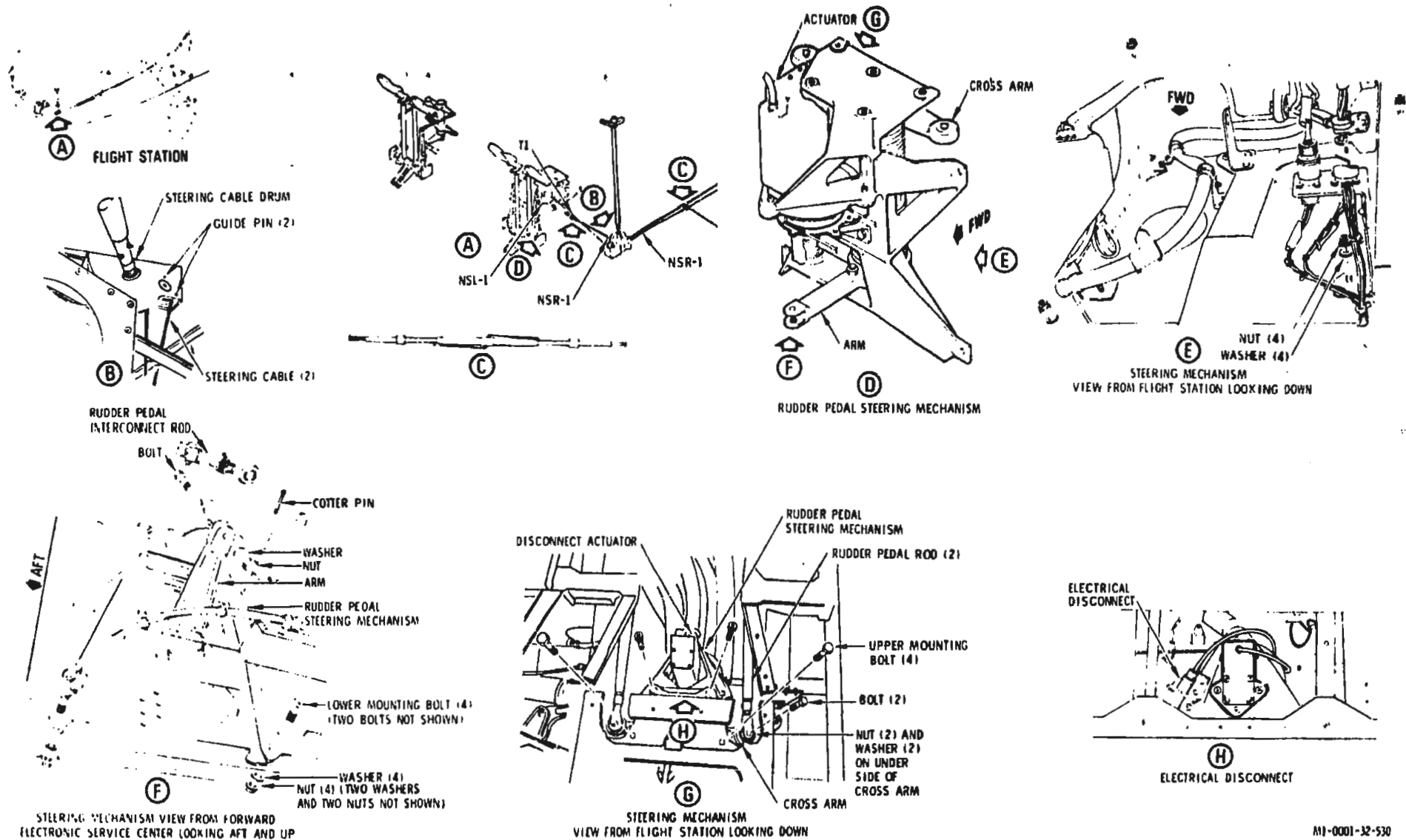


MAINTENANCE MANUAL

- R (5) Remove screws securing control column shroud to deck and position shroud upward on control column clear of work area.
- (6) Remove headset stowage and microphone selector console assembly (Ref. 23-51-09).
- NOTE: There are two means of access to the turnbuckle disconnect point (Ref. Fig. 401) for cable NSL-1 (PN 1504208-105). One is by removing the flight station covering and floor panel shown in Figure 402 [Ref. Step 3A(7)]; the other is through the closeout panel, which is accessible beneath the left luggage compartment, as shown in Figure 403 [Ref. Step 3A(8)].
- R
R
R
R
- R (7) Remove flight station floor panel as follows (Ref. Fig. 402):
- (a) Remove First Observers seat (Ref. 25-11-04).
- R (b) Remove left luggage stowage compartment (Ref. Fig. 403).
- (c) Remove flight station floor panel (Ref. 53-22-01).
- (8) As an alternate procedure, remove closeout panel (Ref. Fig. 403).
- R (9) Open access door 112AB, forward of nose landing gear (NLG) doors, and access hatch 211CB, in flight station door.
- R (10) Through access provided by Step 3A(7) or 3A(8), perform following procedures:
- (a) At turnbuckle T2 (Ref. Fig. 401 View A), attach bungee to cable NSL-2. Lead bungee forward and secure to structure to prevent cable from becoming slack.
- (b) Disconnect cable NSL-1 at turnbuckle T2. Keep barrel on end fitting of bungee-restrained cable.
- R (11) Remove guide pins from cable drum (Ref. Fig. 401 View B).
- (12) Connect pull-wire to cable and withdraw cable through cable drum frame around sheave. Disconnect pull-wire.
- R (13) Disconnect electrical connector for actuator (Ref. Fig. 401 View H).
- R

EFFECTIVITY: ALL

32-51-04
Page 402
May 15/82

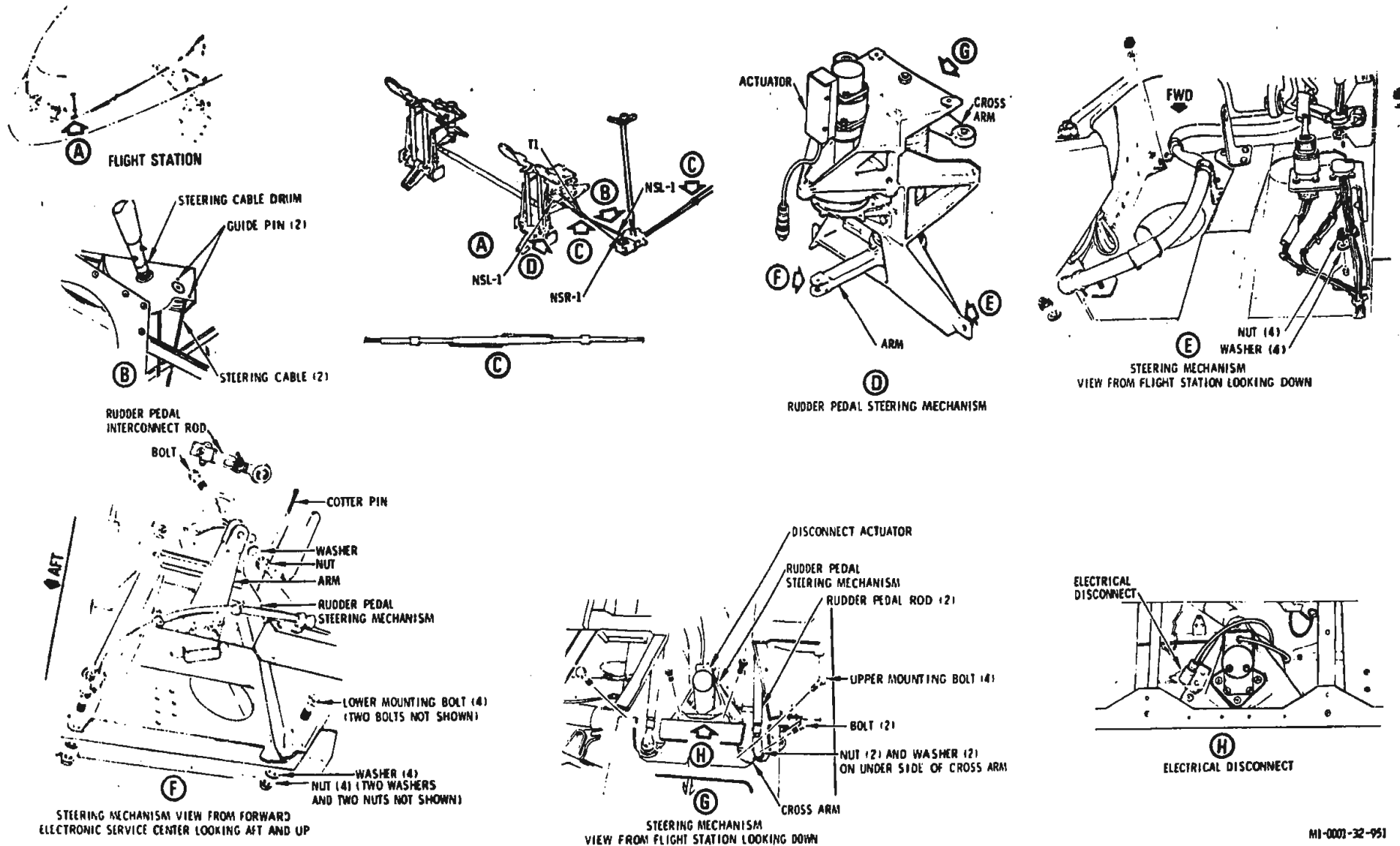


M1-0001-32-530

R Rudder Pedal Steering Mechanism - Removal and Installation
R Figure 401

EFFECTIVITY: 001-031 WITHOUT SB32-137

32-51-04
Page 403/404
May 15/82



MI-0001-32-951

R
R Rudder Pedal Steering Mechanism - Removal and Installation
Figure 401

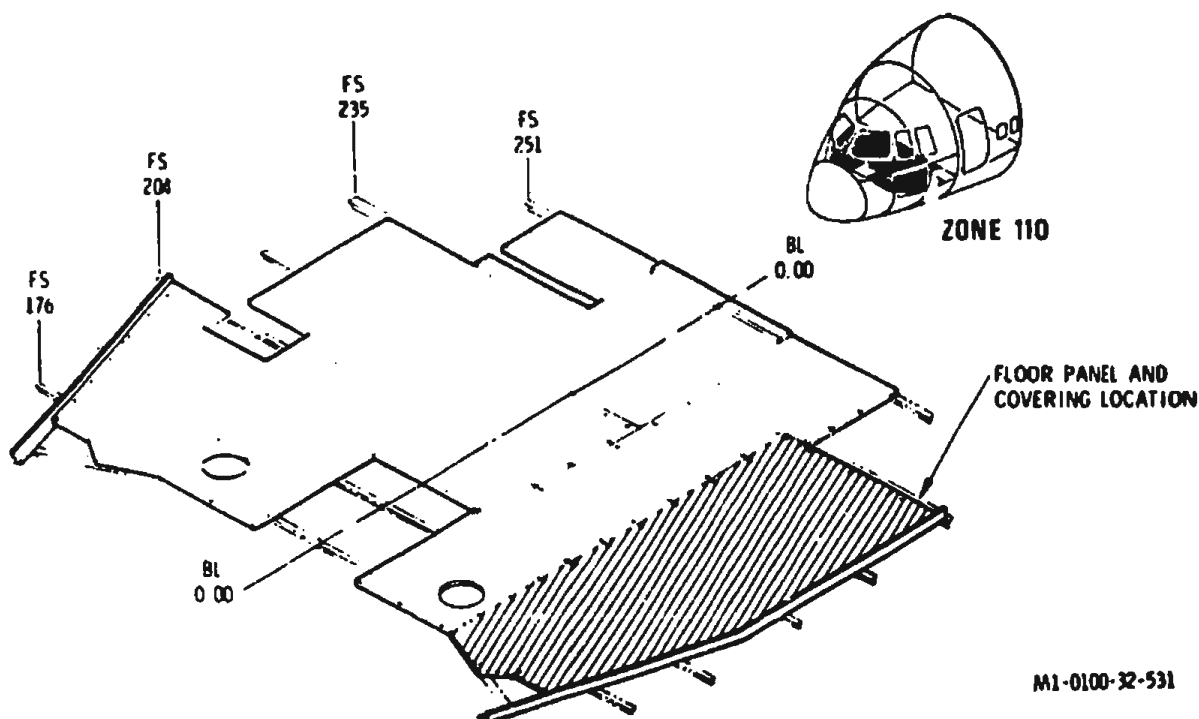
EFFECTIVITY: 001-031 WITH SB32-137 AND 032-999

32-51-04
Page 405/406
May 15/82

LOCKHEED
MAINTENANCE MANUAL

CAUTION: THE DIRECTIONAL GYRO RACK IS A PRECISION ASSEMBLY. ANY LOAD OR FORCE BEARING ON THE RACK OR GYROS, DURING ENTRANCE TO THE FORWARD AREA OF THE FORWARD ELECTRONIC SERVICE CENTER (FESC), IS TO BE AVOIDED. A TEMPORARY SUPPORT STRUCTURE MUST BE PROVIDED.

- (14) In FESC, remove left stick shaker guard (Ref. 22-17-16).
- R (15) Gain access to turnbuckle T1 (Ref. Fig. 401 View A) through opening forward of directional gyros. Remove forward directional gyro, if required, to gain access (Ref. 34-22-04).
- (16) At turnbuckle T1, secure bungee to cable NSR-1; lead inboard and secure to structure. Disconnect cable NSL-1 from NSR-1 keeping barrel with cable NSR-1.
- R (17) Disconnect rudder pedal interconnect from arm (Ref. Fig. 401 View F).
- R (18) Disconnect rudder pedal rods from steering mechanism cross arm (Ref. Fig. 401 View G).
- R



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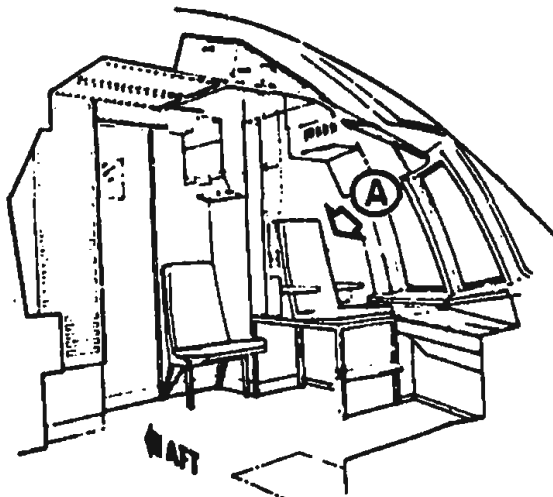
Floor Covering and Panel Location
Figure 402

EFFECTIVITY: ALL

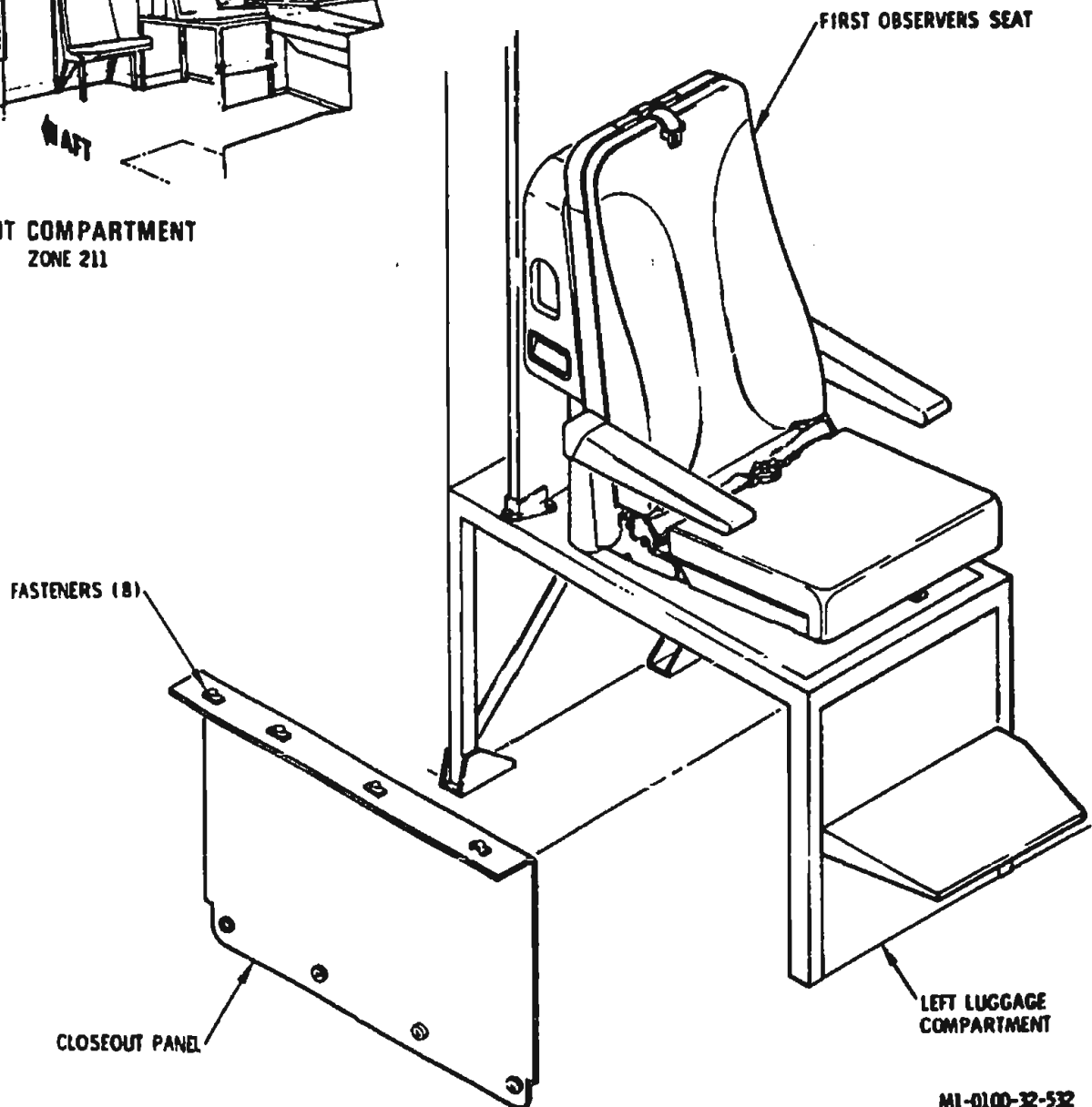
0018

32-51-04
Page 407
May 15/82

LOCKHEED
MAINTENANCE MANUAL



FLIGHT COMPARTMENT
ZONE 211



MI-0100-32-532

Left Luggage Compartment and Closeout Panel
Figure 403

R
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EFFECTIVITY: ALL

32-51-04
Page 408
Mar 15/80



- (19) Remove upper mounting bolts securing steering mechanism to structure (Ref. Fig. 401 Views D and G).
- (20) Support steering mechanism and remove lower mounting bolts (Ref. Fig. 401 Views E and F).
- (21) Remove steering mechanism.

B. Installation

- (1) Position steering mechanism in place and install lower mounting bolts (Ref. Fig. 401 Views E and F).
- (2) Install upper mounting bolts (Ref. Fig. 401 Views D and G).

R
R

CAUTION: ENSURE THAT CENTER ROLLER OF RUDDER PEDAL STEERING MECHANISM IS ENGAGED IN DRIVER SLOT.

- (3) Connect rudder pedal interconnect rod to arm (Ref. Fig. 401 View F).
- (4) Connect rudder pedal rods to cross arm (Ref. Fig. 401 View G).
- (5) At turnbuckle T1, connect short end of cable NSL-1 to NSR-1 (Ref. Fig. 401 View A). Remove bungee.
- (6) Connect end of cable to pull-wire and thread long end of cable NSL-1 through frame of cable drum. Disconnect pull-wire.
- (7) Insert cable in sheave groove and install guide pins (Ref. Fig. 401 View B).
- (8) At turnbuckle T2, connect bungee restrained cable NSL-2 to cable NSL-1. Remove bungee.

NOTE: It may be necessary to form a turnbuckle bridge by bending piano hinge wire into U-shape. Bridge may be used to secure turnbuckle ends while rotating barrel.

- (9) Adjust and test cable rig (Ref. 32-51-00).
- (10) Verify that turnbuckles T1 and T2 are safetied with clips (Ref. Fig. 401 View C).
- (11) Install stick shaker guard (Ref. 22-17-16).
- (12) Connect disconnect actuator electrical connector (Ref. Fig. 401 View H).

EFFECTIVITY: ALL

001B

32-51-04

Page 409
Nov 15/82

LOCKHEED



MAINTENANCE MANUAL

- R (13) Install and test directional gyro if it was removed
R (Ref. 34-22-04).
- R (14) Close access hatch 211CB and access door 112AB.
- R (15) Install flight station floor panel, luggage stowage
R compartment, and observers seat [Ref. Step 3A(7)], or
R closeout panel [Ref. Step 3A(8)], as applicable.
- R (16) Install headset stowage and microphone selector console
R assembly (Ref. 23-51-09).
- (17) Install control column shroud.
- R (18) Install control column shield halves
- (19) Install rudder pedal trim cover (Ref. 25-13-06).
- R (20) Install Captains seat assembly (Ref. 25-11-01).
- R (21) Remove tags and close circuit breakers opened in Step
R 3A(1).

EFFECTIVITY: ALL

001B

32-51-04
Page 410
May 15/82

**RUDDER PEDAL STEERING MECHANISM - ADJUSTMENT AND TEST****1. Equipment and Materials**

Steering Angle Limits Scale, Locally Fabricated

Ten-inch scale capable of indicating 0.01-inch, or equivalent

Plastic Spacer, 0.20-inch thick, or equivalent

Artificial Target, 0.050-inch thick, 4130 steel, or equivalent

Cotter Pin, MS24665-153, or equivalent

Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent

2. Referenced Procedures

24-00-00 Electrical Power - Maintenance Practices

29-11-00 Hydraulic Power System - Maintenance Practices

31-41-00 Weight and Balance System - Adjustment and Test

32-51-00 Nose Gear Steering - Adjustment and Test

3. Adjustment/Test**A. Adjustment**

(1) Turn on electrical power as required (Ref. 24-00-00).

(2) Open access door 112AB, forward of nose landing gear (NLG) doors and access hatch 211CB, in flight station deck.

(3) Aircraft may be resting on nose gear wheels or supported on jacks.

(a) Aircraft on wheels - verify that torque arms are connected.

NOTE: Surface should be smooth and hard. Greased skid plates may be used.

(b) Aircraft on jacks - disconnect NLG torque arms at apex and raise upper arm until locked into detent.



NOTE: When tests are conducted with torque arms disconnected, there may be a tendency for the upper torque arm to continue to drift beyond the commanded steering position. If this occurs, momentarily reverse the command signal to ensure that the steering valve is nulled.

- (4) Ensure that target is covering NLG air/ground safety sensor.
- (5) On aircraft 001-031 without SB32-094, position NLG steering angle to zero as follows:
 - (a) At right side of conduit guard, disconnect conduit clamp from guard (Ref. Fig. 501).
 - (b) At right front of conduit guard, disconnect conduit bracket from guard.
 - (c) At right and left ends of conduit guard, remove nuts securing guard to steering collar.
 - (d) Remove conduit guard.
 - (e) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, open and tag FLIGHT STATION MISC - WEIGHT & BALANCE - AC (F5) and DC (F6) circuit breakers.
 - (f) Disconnect conduit connector.
 - (g) Using upper torque arm as a lever, center steering collar so that 0-degree centering mark on bearing is aligned with strut index mark.
- R (5) On aircraft 001-031 with SB32-094 and 032-999, position NLG steering angle to zero as follows:
 - (a) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, open and tag FLIGHT STATION MISC - WEIGHT & BALANCE - AC (F5) and DC (F6) circuit breakers.
 - (b) Disconnect conduit connector.
 - (c) Using upper torque arm as a lever, center steering collar so that 0-degree centering mark on bearing is aligned with strut index mark.

NOTE: There are two methods of determining steering position angle; one is using the

EFFECTIVITY: ALL

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32-51-04
Page 502
Jul 15/84



MAINTENANCE MANUAL

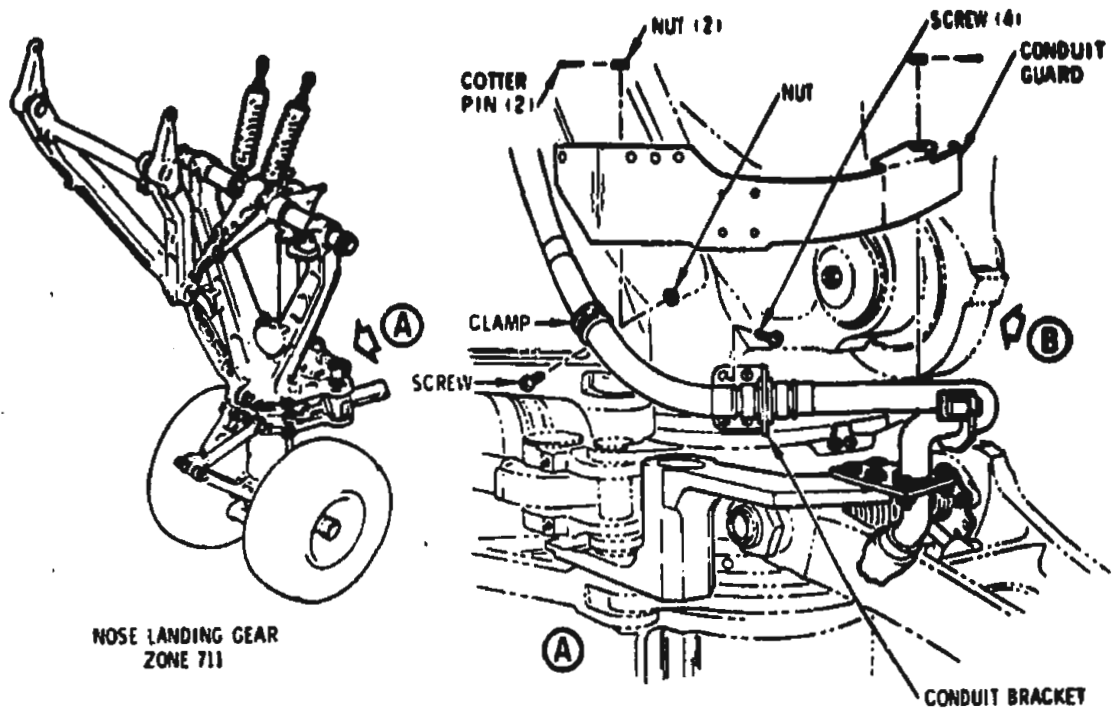
steering angle limits scale [Ref. Step 3A(6)], and the other is by measuring the nose gear steering actuator [Ref. Step 3A(7)]. Perform either Step 3A(6) or Step 3A(7).

- (6) On aircraft 001-031 without SB32-094, prepare to use the steering angle limits scale method as follows:
- (a) Place a vertical line on steering cable lock tab directly below the bearing 0-degree centering mark. Do not scribe or chip paint.
 - (b) Using care to not change position of steering collar, position conduit guard in place and secure with nuts finger tight.
 - (c) Place a similar mark on conduit guard directly above vertical line on steering cable lock tab.
- NOTE:** Marks on steering cable lock tab and conduit guard may be permanently affixed provided marking medium does not destroy and is compatible with paint finish.
- (d) Tighten nuts and safety with cotter pins.
 - (e) Install steering angle limits scale on steering collar conduit guard so that 0-degree mark is centered above mark on conduit guard (Ref. Fig. 502 and 503). Tape in place.

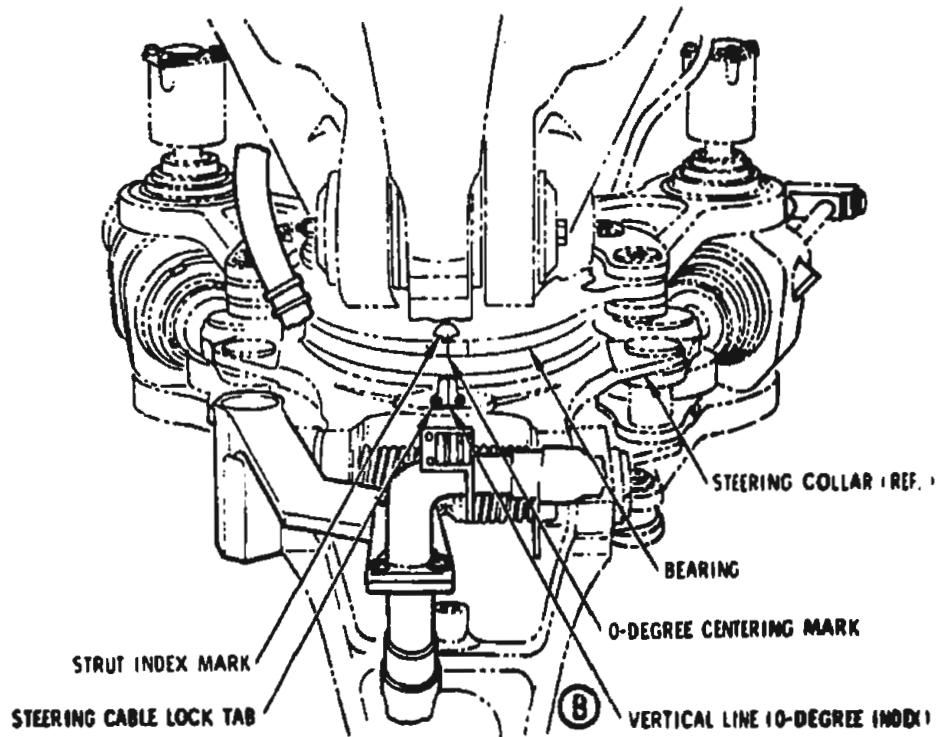
- R
- (6) On aircraft 001-031 with SB32-094 and 032-999, prepare to use the steering angle limits scale method as follows:
- (a) Center steering collar as in Step 3A(5).
 - (b) Place a vertical line on steering cable lock tab directly below the bearing 0-degree centering mark. Do not scribe or chip paint.
- NOTE:** Marks on steering cable lock tab may be permanently affixed provided marking medium does not destroy and is compatible with paint finish.
- (c) Install steering angle limits scale on steering collar conduit guard so that 0-degree mark is centered above mark on steering cable lock tab (Ref. Fig. 502 and 503). Tape in place.

EFFECTIVITY: ALL

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MAINTENANCE MANUAL



NOSE LANDING GEAR
ZONE 711



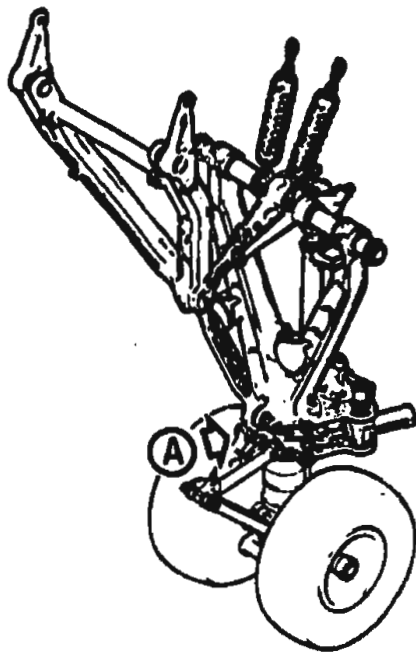
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Nose Gear Steering Indexing and Marking
Figure 501

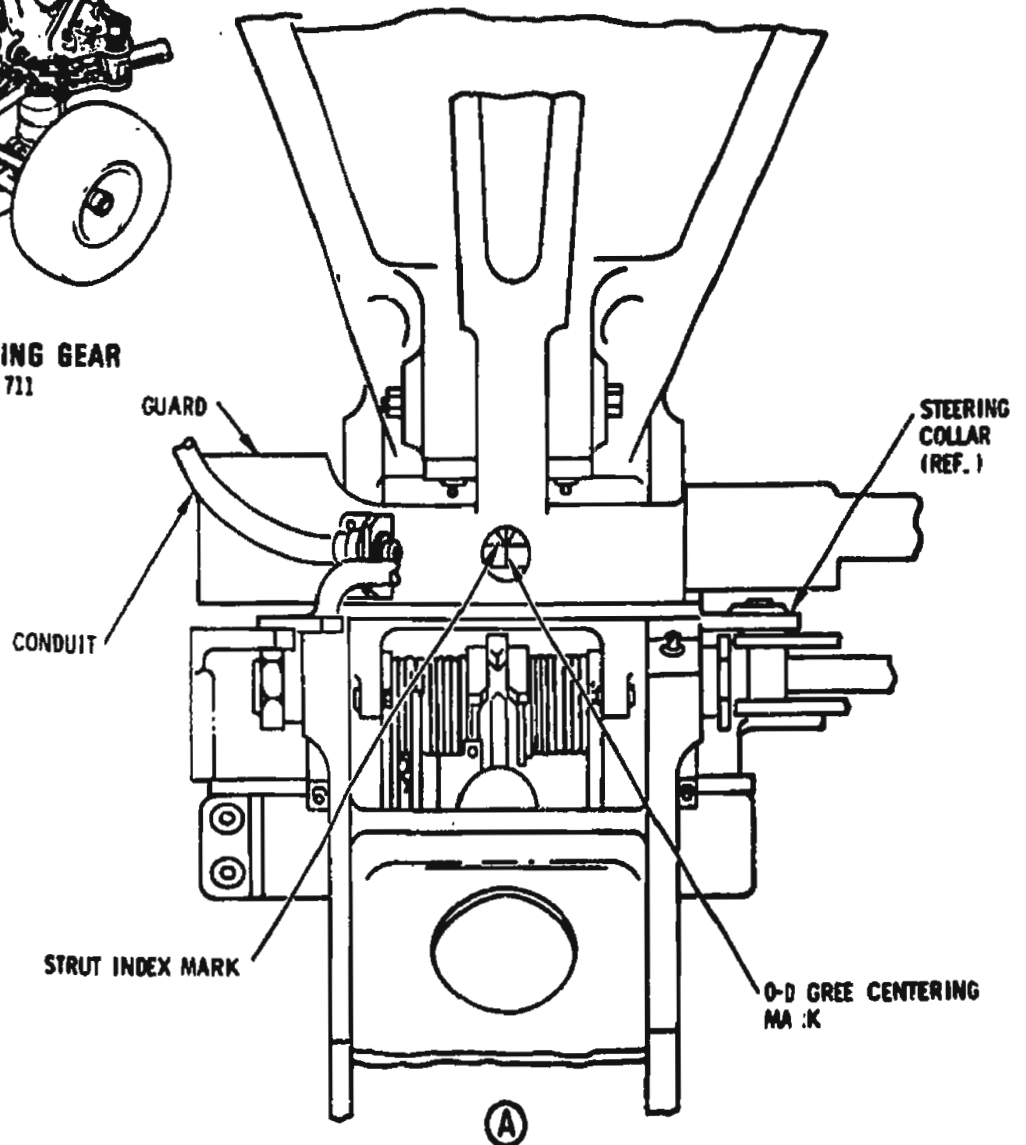
R EFFECTIVITY: 001-031 WITHOUT SB32-094
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32-51-04
Page 504
Jun 15/79

LOCKHEED
MAINTENANCE MANUAL



NOSE LANDING GEAR
ZONE 711



M1-0100-32-576

Nose Gear Steering Indexing and Marking
Figure 501

R
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001B EFFECTIVITY: 001-031 WITH SB32-094 AND 032-999

32-51-04
Page 505
Jul 15/84



- (7) Prepare to use the steering actuator piston travel method as follows:
- (a) Using a marking device that will not scribe or chip paint, mark the center of each actuator pin thru-bolt head (Ref. Fig. 503).
 - (b) Verify that the nose gear steering is zero indexed and measure distance from center of thru-bolt head to gland nut on both actuators.
- NOTE:** The zero-indexed dimension is the reference from which nose gear steering angle is determined. The table contained in Figure 503 provides a dimension which is to be added to the zero-indexed dimension to obtain a steering angle. As an example, if a steering angle of 10 degrees is required, add 1.04 inches to the zero-indexed dimension. When the piston extension distance has equalled this combined dimension, the steering angle is 10 degrees.
- (c) On aircraft 001-031 without SB32-094, install conduit guard, tighten nuts, and safety with cotter pins.
- (8) Ensure that no rigpins are installed in NLG steering system mechanisms.
- (9) Ensure that rudder travel area is clear of equipment and personnel.
- (10) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, ensure that MLG GND SENSE (L8) and GEAR NOSE STEERING (F19) circuit breakers are closed.
- (11) On Flight Engineer/Second Officers aft circuit breaker panel CB3, ensure that PROXIMITY SWITCH 3 (H4) circuit breaker is closed. On Pilots overhead circuit breaker panel CB1, ensure that PROX SW PWR NO. 1 (L10) circuit breaker is closed.

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EFFECTIVITY: ALL

001B

32-51-04

Page 506
Nov 15/84



MAINTENANCE MANUAL

R

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES, GEAR DOOR TRAVEL AREAS AND NLG UPPER TORQUE ARM.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (12) Turn on hydraulic system C pressure (Ref. 29-11-00).

NOTE: When applying full rudder pedal while NLG torque arms are disconnected, nose gear may continue to steer beyond rudder pedal steering limits.

- (13) Apply full right rudder pedal. Steering angle must be between 9 and 13 degrees to the right.

- (14) Apply full left rudder pedal. Steering angle must be between 9 and 13 degrees to the left. Steering angles for right and left sides must be within two degrees of each other.

- (15) If steering angles are not within the two-degree tolerance, perform Steps 3A(16) through 3A(18). If steering angles are within tolerance, perform Steps 3A(19) through 3A(24). If steering angle becomes greater than 9 to 13 degrees, connect torque arms and repeat test to ensure that steering angle displacement is within tolerance for both sides.

NOTE: Under very low system friction conditions, steering may creep to the maximum steering angle.

- (16) Position rudder pedals to centered position and install rigpin (Ref. Fig. 502, VIEW F and G).

- (17) Measure distance from DATUM A to driver points (Ref. Fig. 502, View B). Distances should be approximately 5.3 inches with a differential of not more than 0.040 inch. If differential is greater than 0.040 inch, adjust driver springs (override springs) as follows:

NOTE: If the differential is such that the left distance is less than the right distance, the nose wheel steering is off to the right side, and the lower spring adjusting bolt must be let

EFFECTIVITY: ALL



out to increase the distance between the lower spring anchor and the driver lug. If the right distance is less, the opposite situation prevails, and the upper bolt is let out. It is important to note that when either bolt is let out, the other bolt must be driven in to maintain constant spring balance.

- (a) Disconnect rudder interconnect push rod (Ref. Fig. 502, VIEW D).
 - (b) Ensure that rudder pedal steering actuator is disengaged.
 - (c) Remove rigpin.
 - (d) Manually position driver and spring assembly to permit drive spring adjustment.
 - (e) Let out applicable adjusting bolt one turn and drive in opposite bolt one turn.
 - (f) Center driver and spring assembly and install rigpin.
 - (g) Measure distances from DATUM A to driver points. If differential is greater than 0.040 inch, repeat Steps 3A(17)(b) through 3A(17)(f) until correct differential is obtained.
 - (h) Check steering position by repeating Steps 3A(13) and 3A(14).
 - (i) Remove rigpin, lock adjusting bolts with lock nuts, and safety with lock-wire.
 - (j) Connect rudder interconnect push rod and safety nut with cotter pin.
- (18) Connect torque arms and perform nose gear steering system test (Ref. 32-51-00).
 - (19) If used, remove steering angle limits scale from steering collar.
 - (20) Install conduit clamp.
 - (21) Install conduit bracket.
 - (22) Connect conduit connector.

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MAINTENANCE MANUAL

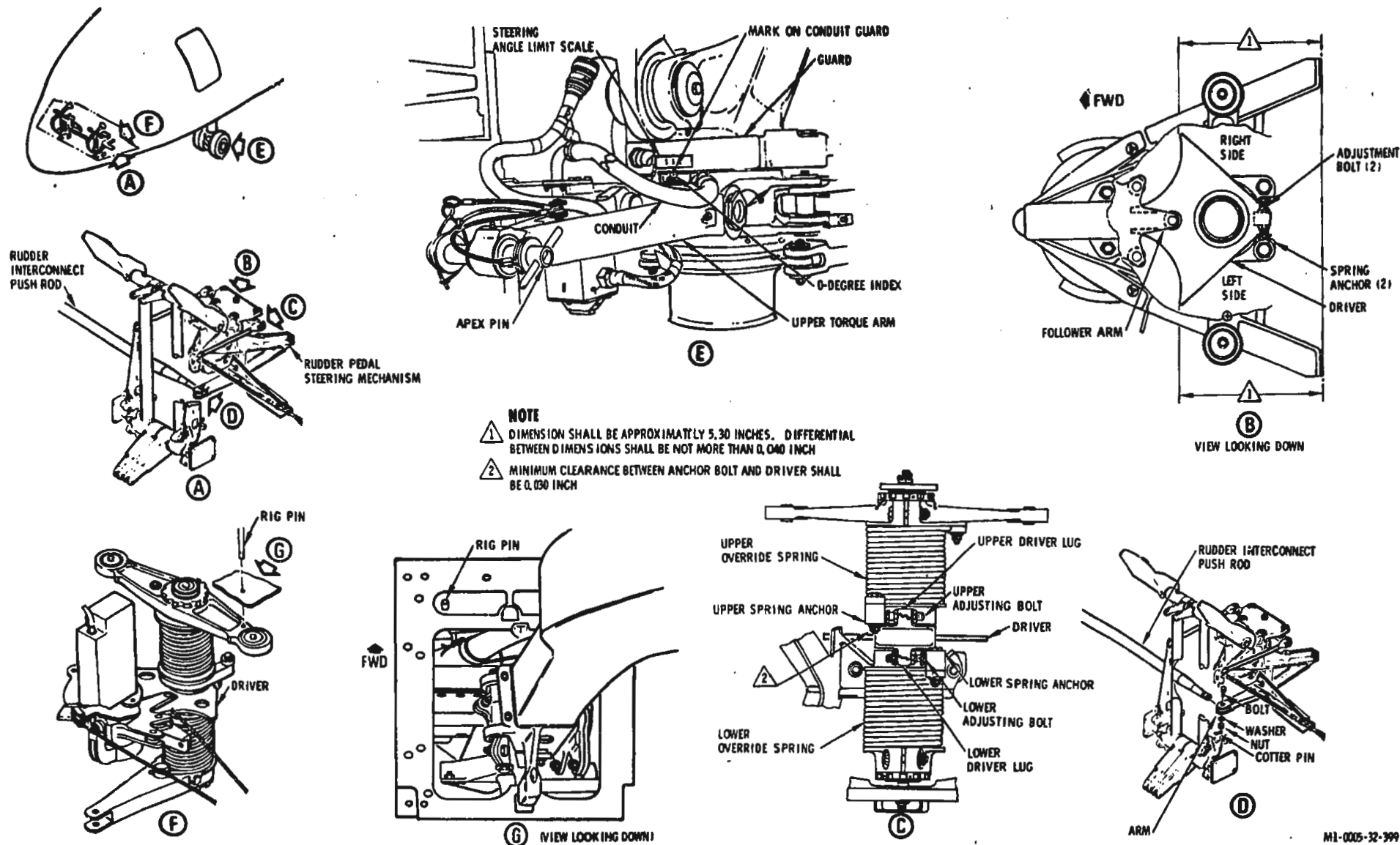
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- (23) Remove tags and close circuit breakers opened in Step 3A(5).
- (24) Perform weight and balance system test (Ref. 31-41-00).
- (25) Close access door 112AB and access hatch 211CB.
- (26) Turn off hydraulic system C as required (Ref. 29-11-00).
- (27) Turn off electrical power as required (Ref. 24-00-00).

EFFECTIVITY: ALL

0018

32-51-04
Page 509/510
May 15/82



Rudder Pedal Steering Mechanism - Adjustment and Test
Figure 502

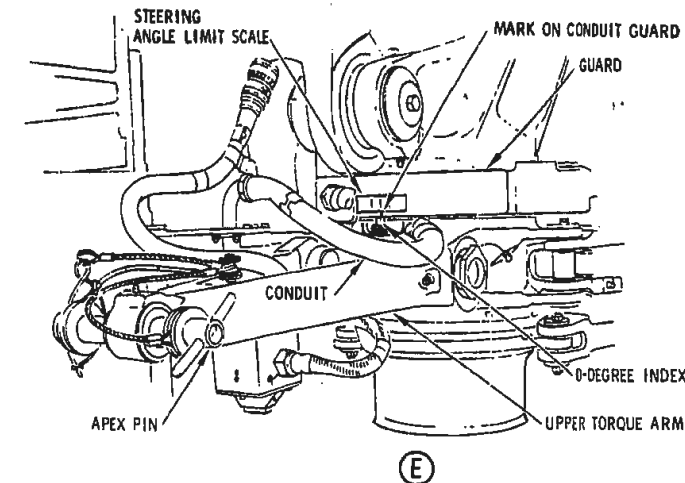
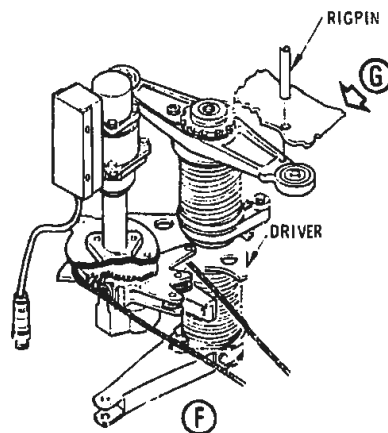
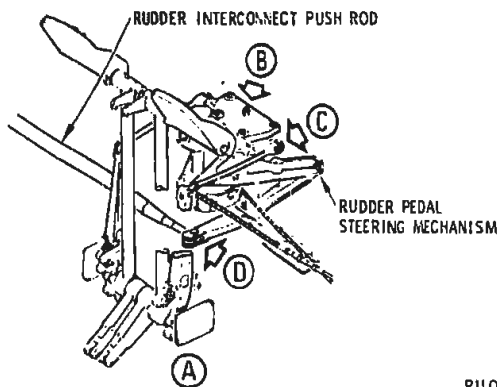
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32-51-04
Page 511/512
Aug 15/82

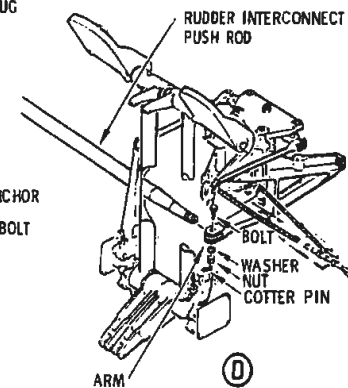
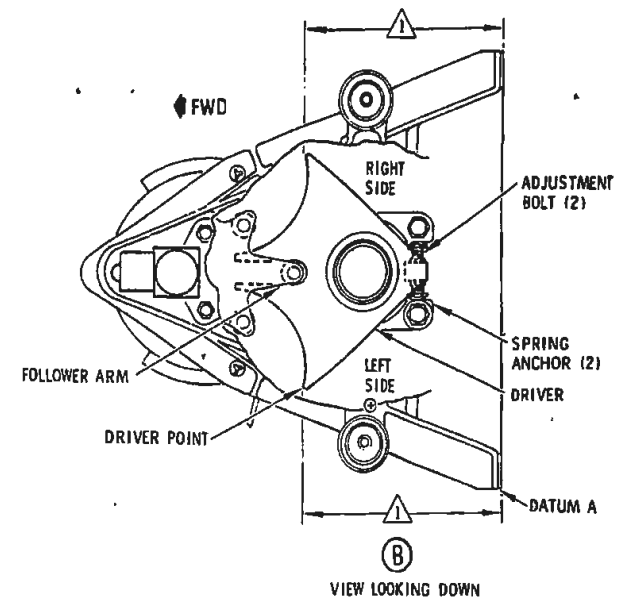
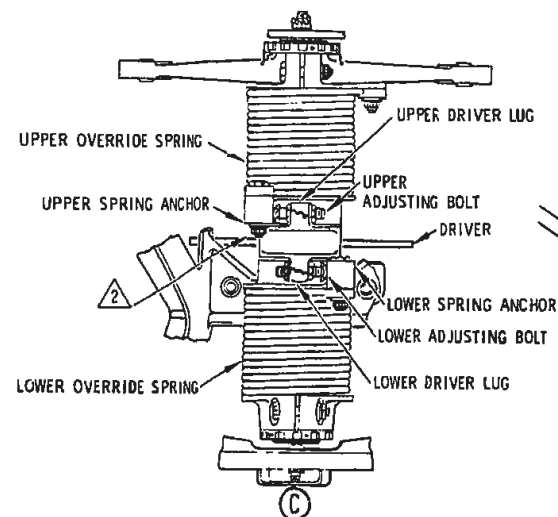
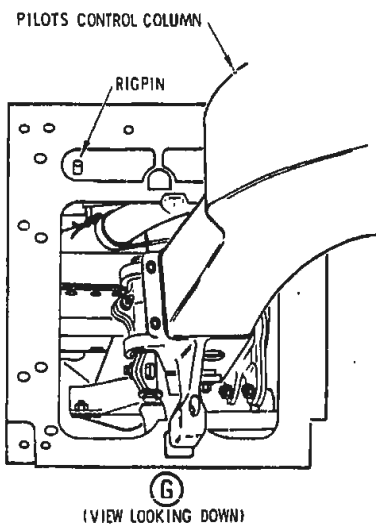
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1. DIMENSION SHALL BE APPROXIMATELY 5.30 INCHES. DIFFERENTIAL BETWEEN DIMENSIONS SHALL BE NOT MORE THAN 0.040 INCH
2. MINIMUM CLEARANCE BETWEEN ANCHOR BOLT AND DRIVER SHALL BE 0.030 INCH



(VIEW LOOKING DOWN)

Diagram illustrating the components of the steering actuator assembly:

- 10-INCH SCALE
- CENTER OF BOLT HEAD
- ACTUATOR PIN THROUGH-BOLT HEAD
- EDGE OF GLAND NUT
- AFT COLLAR
- ACTUATOR PISTON
- GLAND NUT
- STEERING ACTUATOR

12 INCHES

1 INCH

67 65 63

14 13 12 10 9 8

1 2 0 2

8 9 10 12 13 14

63 65 67

0.16 INCH

0.16 INCH

0.16 INCH

0.16 INCH

0.67 INCH

0.083 INCH

0.083 INCH

0.083 INCH

0.083 INCH

5.3 INCH

MAKE FROM APPROXIMATE 0.005 IN. SHIM STOCK

NOTE
 STEERING ANGLE IN DEGREES

R EFFECTIVITY: ALL
R
0018

32-51-04
Page 515/516
Jun 15/79

LOCKHEED
MAINTENANCE MANUAL

NOSE LANDING GEAR STEERING TRUNNION VALVE
REMOVAL AND INSTALLATION

1. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.040-inch diameter, or equivalent

2. Referenced Procedure

29-11-00 Hydraulic Power System - Maintenance Practices

3. Removal/Installation

A. Removal

- (1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker ALTN GEAR CONT.
- (2) Ensure that main landing gear (MLG) and nose landing gear (NLG) downlock safety pins are installed.
- (3) Ensure that hydraulic system C pressure is 0 psi (Ref. 29-11-00).
- (4) At top of steering valve, bleed off any residual hydraulic pressure by opening both bleed valves (Ref. Fig. 401).
- (5) Remove bolts and slide transfer tube locking flange back along transfer tubes.
- (6) Slide transfer tubes, through trunnion valves, out of steering valve.
- (7) Using a spanner wrench, unscrew trunnion valve nut until clear of trunnion nut.
- (8) Remove trunnion valve, transfer tubes, and locking flange.
- (9) If alignment and locking pin comes out with trunnion valve, reinstall pin in pin-hole of steering actuator trunnion.
- (10) Remove transfer tubes and locking flange from trunnion valve by sliding tubes out of trunnion valve.

B. Installation

EFFECTIVITY: ALL

32-51-05
Page 401
Nov 15/77



- (1) Ensure that hydraulic system C pressure is 0 psi.
- (2) Ensure that circuit breaker opened in Step 3A(1) is opened and tagged.
- (3) Inspect both seals on trunnion valve lower end for wear or damage. Replace as required.
- (4) Lubricate O-rings on transfer tube with hydraulic fluid, and insert into and through trunnion valve.
- R (5) Lubricate trunnion valve seals with hydraulic fluid.
- R (6) Slide trunnion valve nut upward against body of valve and retain in this position until valve has been
R inserted into steering actuator trunnion until
R alignment and locking pin is aligned and inserted into
R pin-hole in trunnion valve. The pin must engage both
R trunnion valve and steering actuator trunnion.
- R (7) Continue to insert valve until it bottoms out. Screw
R trunnion valve nut into trunnion.
- R (8) Inspect all O-rings on transfer tubes for damage.
R Replace as required.
- R (9) Lubricate O-rings with hydraulic fluid.
- R (10) Insert transfer tubes into steering valve until
R transfer tubes bottom out.
- R (11) Position locking flange against steering valve and
R secure in place with bolts.
- R (12) Tighten trunnion nut to a maximum torque of 220 lb in.
- R (13) Tighten transfer tube locking flange bolts to a torque
R of 95 to 105 lb in.
- R (14) Safety bolts with lock-wire.
- R (15) Close bleed valves.
- R (16) Turn on hydraulic system C pressure.
- R (17) Bleed any air from system using bleed valve.
- R (18) Remove tag and close circuit breaker opened in Step
R 3A(1).
- R (19) Using steering wheel, cycle steering system from
side-to-side noting that 65-degree index marks on upper

EFFECTIVITY: ALL

LOCKHEED



MAINTENANCE MANUAL

steering plate guard line up with 0-degree index on steering collar. Inspect for hydraulic leaks.

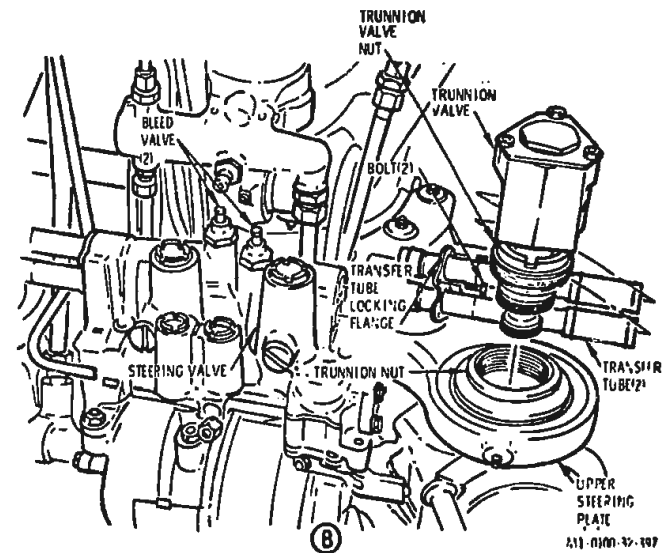
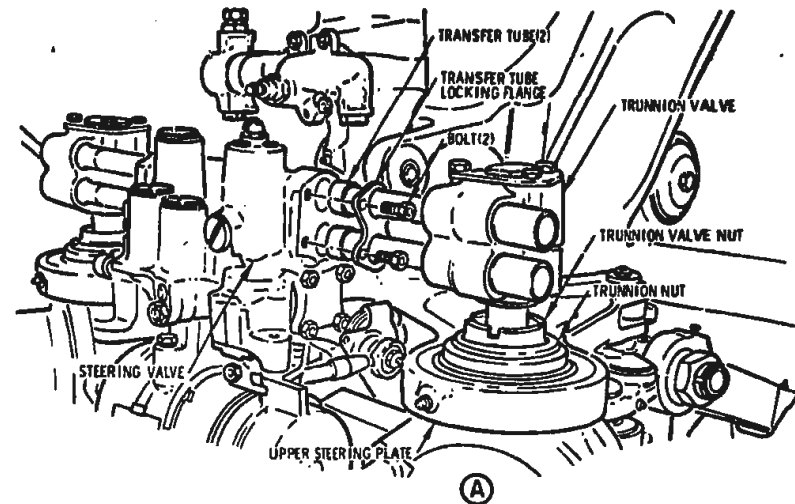
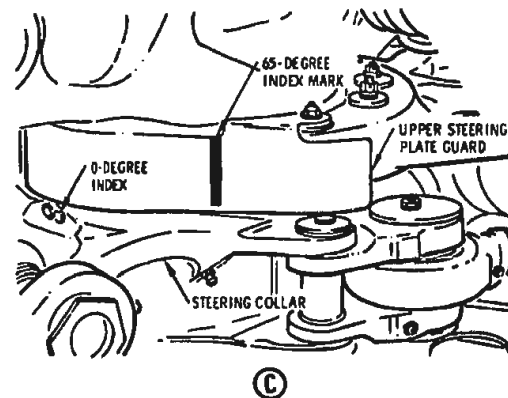
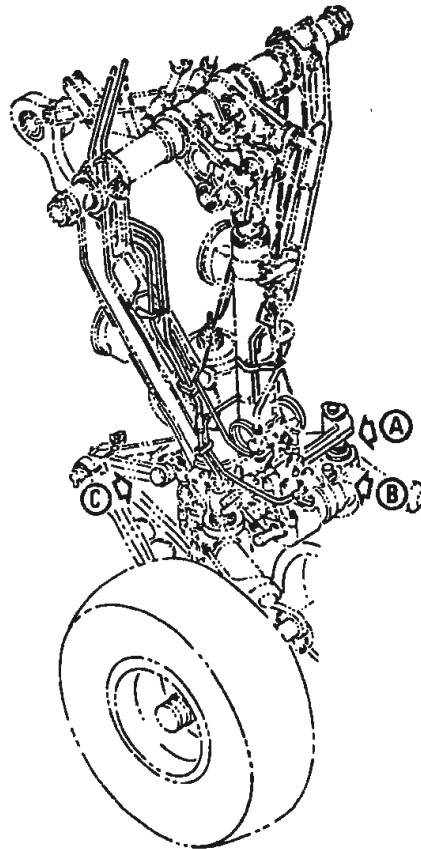
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(20) Turn off hydraulic system C pressure (Ref. 29-11-00).

EFFECTIVITY: ALL

001B

32-51-05
Page 403/404
Nov 15/77



Nose Landing Gear Steering Trunnion Valve - Removal and Installation
Figure 401



R NOSE_LANDING_GEAR_STEERING_TRUNNION_VALVE_-_APPROVED_REPAIRS

R 1. Equipment and Materials

R Hydraulic fluid, LAC Spec C-34-1224, Type III, or equivalent

R Lock-wire, Fed Spec QQ-W-390, 0.040-inch diameter, or equivalent

R 2. Referenced Procedures

R 10-10-00 Parking - Maintenance Practices

R 24-00-00 Electrical Power - Maintenance Practices

R 29-11-00 Hydraulic Power System - Maintenance Practices

R 3. Approved Repairs

R A. Removal of Seals

R (1) On pilots overhead circuit breaker panel CB1, zone 210,
R open and tag circuit breaker ALTN GEAR CONT (L14).R (2) Verify that all landing gear downlock safety pins are
R installed (Ref. 10-10-00, Normal Parking).R (3) Verify that hydraulic system C hydraulic pressure is 0
R psi.R (4) At top of steering valve, bleed off any residual
R hydraulic pressure by opening both bleed valves (Ref.
R Fig. 801).R (5) Remove bolts securing transfer tube locking flange to
R steering valve.R (6) Slide transfer tube out of steering valve and through
R trunnion valve until transfer tube seals are exposed.

R (7) Remove O-ring and seal backups.

R B. Installation of Seals

R (1) Position O-ring and seal backups in transfer tube
R groove. Orient seal backup scarf joints so that they
R are on opposite sides of transfer tube.

R (2) Lubricate O-ring and seal backups with hydraulic fluid.

R EFFECTIVITY: ALL

LOCKHEED



MAINTENANCE MANUAL

- (3) Slide transfer tube with seals through trunnion valve and into steering valve.
- (4) Secure transfer tube locking flange to steering valve with bolts. Tighten bolts to a torque of 95 to 105 lb in. and safety with lock-wire.
- (5) Close bleed valves.

R

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

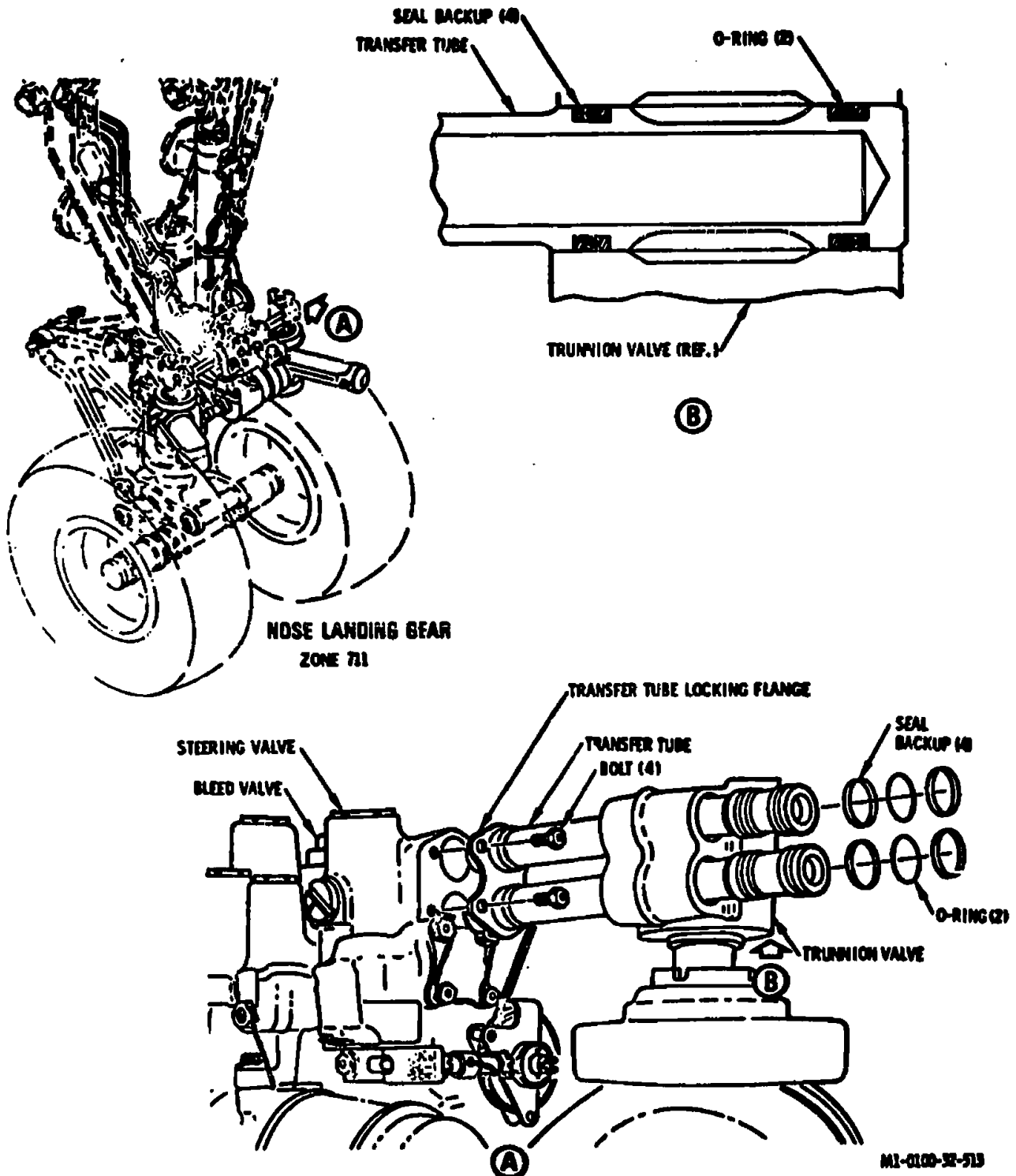
- (6) Turn on hydraulic system C pressure (Ref. 29-11-00).
- (7) Turn on electrical power (Ref. 24-00-00).
- (8) Bleed any air from steering assembly using bleed valves.
- (9) Remove tag and close circuit breaker opened in Step A(1).
- (10) Using steering hand-wheel, cycle steering system from side to side. Inspect for hydraulic leaks.
- (11) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (12) Turn off electrical power (Ref. 24-00-00).

EFFECTIVITY: ALL

0018

32-51-05
Page 802
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



Transfer Tube Seal Replacement
Figure 801

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EFFECTIVITY: ALL

32-51-05
Page 803/804
Feb 15/75

001B



NOSE LANDING GEAR STEERING VALVE ASSEMBLY
REMOVAL AND INSTALLATION

1. Equipment and Materials

Cotter Pin, MS24665-151, or equivalent

Cotter Pin, MS24665-153, or equivalent

Lock-wire, Fed Spec QQ-W-390, 0.040-inch diameter, or equivalent

Low Adhesion Sealing Compound, LAC Spec C-40-769, Type I, or equivalent

2. Referenced Procedures

20-00-03 Sealing of Threaded Steel Joints for Corrosion Protection (PB75-484)

R 29-11-00 Hydraulic Power System - Maintenance Practices

3. Removal/Installation

A. Removal

- (1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breaker ALTN GEAR CONT.
- (2) Ensure that main landing gear (MLG) and nose landing gear (NLG) downlock safety pins are installed.
- (3) Ensure that hydraulic system C pressure is 0 psi (Ref. 29-11-00).
- (4) At top of steering valve, bleed off any residual hydraulic pressure by opening both bleed valves (Ref. Fig. 401).
- (5) Remove bolts and slide tube locking flanges back along transfer tubes.
- (6) Slide transfer tubes, through trunnion valves, out of steering valve.
- (7) Disconnect return and pressure line B-nuts. Catch any spilling fluid with cloths. Cap and plug lines and parts.

EFFECTIVITY: ALL

001B

32-51-06
Page 401
Nov 15/88



- (8) Remove nut and flange washer, then disconnect steering valve control input link from control beam assembly. Do not upset adjustment of input link.
- (9) Reinstall flange washer and nut onto control beam.
- (10) Remove locking pin and remove valve pin securing valve assembly to lower steering plate.
- (11) Support valve assembly, then remove bolts securing valve assembly to upper steering plate.
- (12) Remove valve assembly.

B. Installation

- (1) Ensure that hydraulic system C pressure is 0 psi.
- (2) Ensure that circuit breaker opened in Step 3A(1) is open and tagged.
- (3) Position valve assembly on upper and lower steering plates.
- (4) Install bolts securing valve assembly to upper steering plate.
- (5) Coat exposed bolt threads and nut end with low adhesion sealing compound (Ref. 20-00-03).
- (6) Install valve pin securing valve assembly to lower steering plate.
- (7) Install locking pin in valve pin and spacer, and safety with MS24665-151 cotter pin.
- (8) Remove nut and flange washer from control beam.
- (9) Connect input link to control beam.
- (10) Reinstall flange washer and nut.
- (11) Safety with MS24665-153 cotter pin.
- (12) Coat exposed threads, nut, and cotter pin with low adhesion sealing compound (Ref. 20-00-03).
- (13) Connect return and pressure lines. Tighten B-nuts.
- (14) Lubricate transfer tube O-rings with hydraulic fluid, and slide tubes into valve.



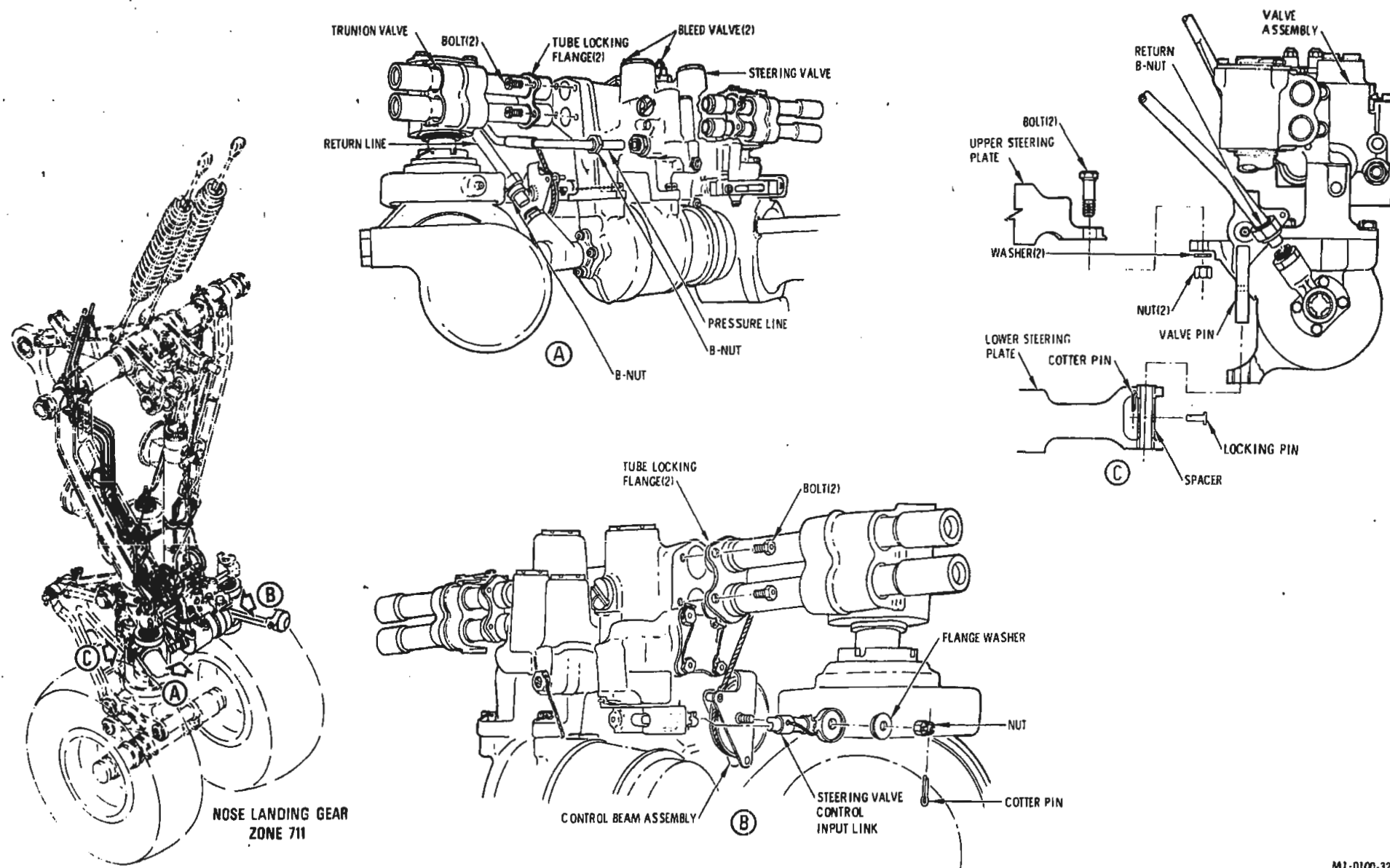
- (15) Position locking flanges against valve assembly and secure in place. Torque bolts to 95 to 105 lb in.
- (16) Safety bolts with lock-wire.
- (17) Close bleed valves.
- (18) Turn on hydraulic system C pressure.
- (19) Bleed any air from system using bleed valves.
- (20) Remove tag and close circuit breaker opened in Step 3A(1).
- (21) Using steering hand-wheel, cycle steering system from side to side. Inspect for hydraulic leaks.

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EFFECTIVITY: ALL

001B

32-51-06
Page 403/404
Nov 15/88



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Nose Landing Gear Steering Valve - Removal and Installation
Figure 401

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EFFECTIVITY: ALL

001B

32-51-06
Page 405/406
Jul 15/73

LOCKHEED
MAINTENANCE MANUAL

NOSE LANDING GEAR STEERING COLLAR - REMOVAL AND INSTALLATION

1. Equipment and Materials

Cotter Pin, MS24665-153, or equivalent

Cotter Pin, MS24665-155, or equivalent

Cotter Pin, MS24665-306, or equivalent

Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent

Tensiometer 0-100 lb capacity

R Grease, Ref. MM 12-20-00, Lubrication, Scheduled Servicing

Low Adhesion Sealing Compound, LAC Spec C-40-769, Type II, or equivalent

Bungee Cord, 1/4-inch diameter, or equivalent

2. Referenced Procedures

12-24-21 Nose Landing Gear Lubrication

20-51-04 Environmental Sealing of Model L-1011 Airplane
(P875-425)

24-00-00 Electrical Power - Maintenance Practices

29-11-00 Hydraulic Power System - Maintenance Practices

32-51-05 Nose Landing Gear Steering Trunnion Valve - Removal
and Installation

3. Removal/Installation

A. Removal

(1) Verify that hydraulic system C pressure is zero psi
(Ref. 29-11-00).

(2) Remove conduit guard (Ref. Fig. 401).

(3) Remove bolt securing upper torque arm to steering
collar.

EFFECTIVITY: ALL

32-51-10
Page 401
Dec 15/93

001B



MAINTENANCE MANUAL

- (4) Lower torque arm clear of steering collar lugs and support torque arms so that no strain is placed on conduits.
- (5) Disconnect pressure and return hydraulic lines from steering valve. Plug lines and cap valve ports to prevent hydraulic fluid spillage and contamination.
- (6) Open left environmental control system (ECS) access door 117AL.
- (7) Using two pieces of bungee cord of sufficient length to permit a stretch of 18 inches minimum, jumper the two steering cable turnbuckles (Ref. Fig. 401).

NOTE: Bungee cords must be secured to steering cables in such a way that when the turnbuckles are disconnected, the two parts of each turnbuckle can be separated a minimum distance of 18 inches. This will maintain a tension on the cables, when disconnected, so that slack will not cause fouling of the cables.

- (8) Disconnect steering cables at turnbuckles.
- (9) At front side of strut, remove retainer and dislocate steering cable to a position below upper torque arm mounting lugs, clear of forward steering collar (Ref. Fig. 402).
- (10) Remove bolts and then remove both actuator pins.
- (11) Remove bolts and then remove all but one steering pin from lower steering plate.

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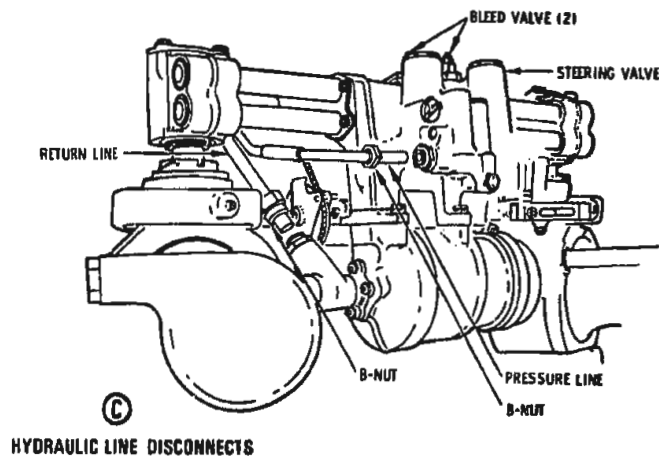
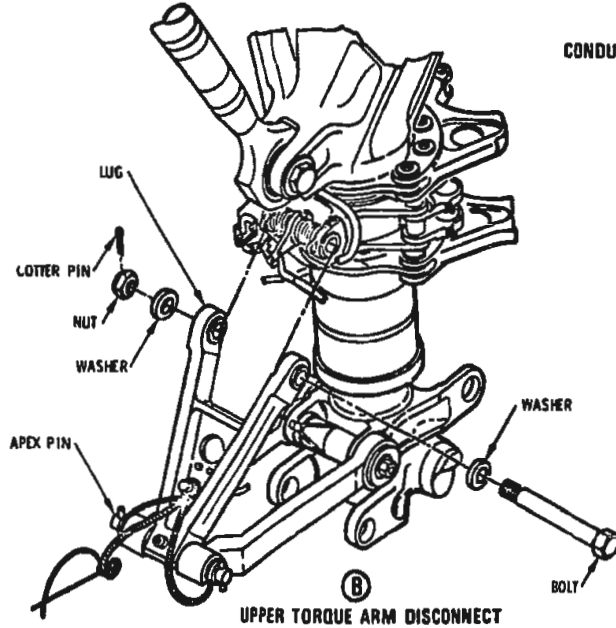
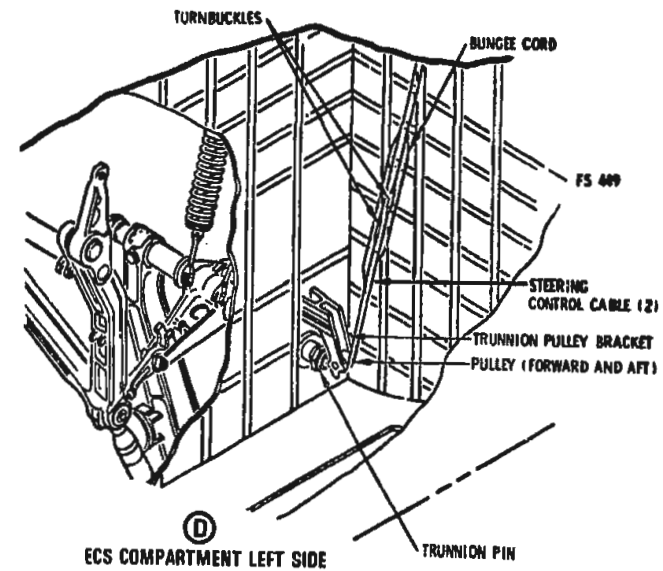
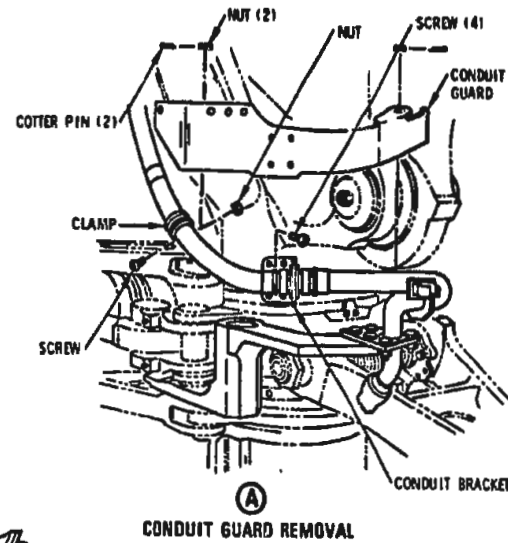
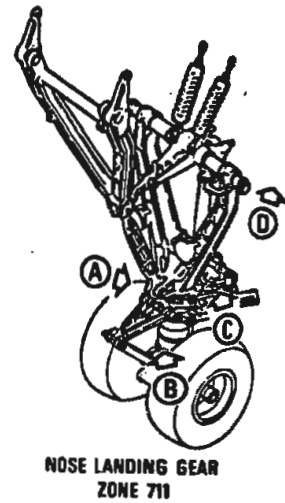
WARNING: THE STEERING ASSEMBLY CONSISTING OF UPPER AND LOWER STEERING PLATES, RIGHT AND LEFT STEERING ACTUATORS AND THE STEERING VALVE ASSEMBLY WEIGHS APPROXIMATELY 50 POUNDS. PROPER SUPPORT EQUIPMENT MUST BE PROVIDED.

- (12) Position a steady support structure so that when steering assembly is disconnected from steering collar, it can be rested on support structure approximately one foot away from strut.
- (13) Remove bolts and then remove all but one steering pin from upper steering plate.
- (14) Support steering assembly, remove steering pins from upper and lower steering plates, and move steering assembly back away from strut approximately one foot.

EFFECTIVITY: ALL

001B

32-51-10
Page 402
Aug 15/81



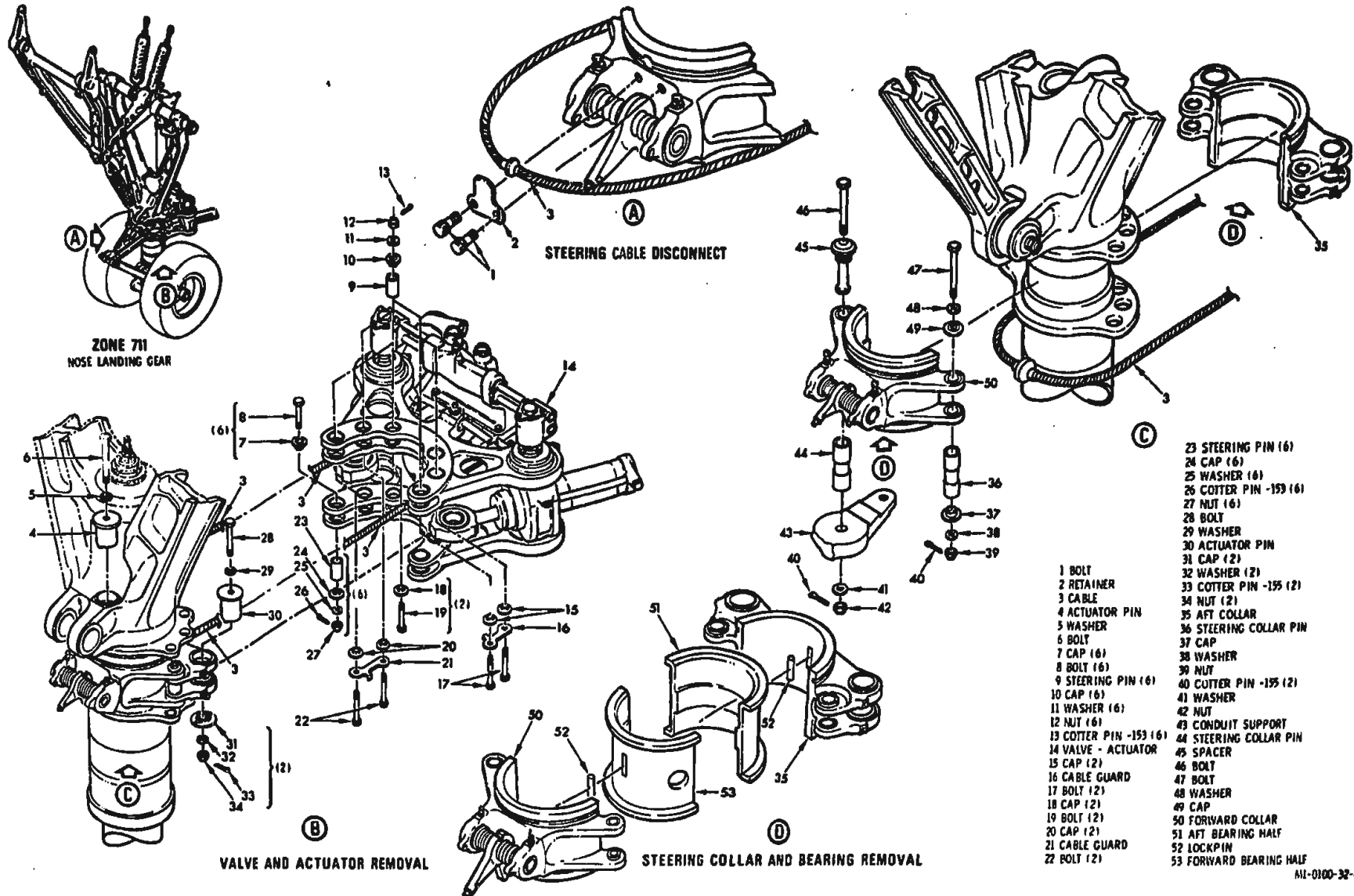
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Preliminary Procedures
Figure 401

EFFECTIVITY: ALL

32-51-10
Page 403/404
Aug 15/74

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Nose Landing Gear Steering Collar - Removal and Installation
Figure 402

EFFECTIVITY: ALL

32-51-10
Page 405/406
Aug 15/74

MI-0100-32-475

LOCKHEED
MAINTENANCE MANUAL

NOTE: Tension on steering cable is caused by bungee cord tension.

- (15) Support forward and aft steering collars.
- (16) Remove bolts and then remove both steering collar pins.

R CAUTION: STEERING COLLAR HALVES ARE MATCHED PAIRS AND CANNOT BE INTERMIXED WITH OTHER STEERING COLLAR PAIRS.

STEERING COLLAR BEARING HALVES ARE MATCHED PAIRS AND CANNOT BE INTERMIXED WITH OTHER BEARING PAIRS. BEARING PAIRS ARE NOT MATCHED TO PARTICULAR STEERING COLLAR PAIRS AND CAN BE USED WITH OTHER COLLARS.

BEARINGS MAY NOT BE RETAINED BY STEERING COLLAR HALVES WHEN STEERING COLLARS ARE REMOVED. CARE MUST BE EXERCISED TO PREVENT BEARING DAMAGE CAUSED BY IMPACT WITH STRUT OR FLOORS.

- (17) Remove forward and aft steering collars.
- (18) Remove bearing halves from steering collar halves as required.

B. Installation

- (1) Verify that outer surfaces of bearing and inner surfaces of steering collars are clean.
- (2) Install lockpins in recesses provided in outside surface of bearings (Ref. Fig. 403).

R CAUTION: THE FRONT BEARING HALF HAS INDEX MARKS SCRIBED INTO THE EDGE OF THE BEARING FACE. WHEN CORRECTLY INSTALLED, THE INDEX MARKS WILL BE MATCHED WITH THE TOP OF THE FORWARD STEERING COLLAR. THE CENTER ONE OF THE THREE INDEX MARKS IS REQUIRED DURING CABLE TENSIONING AND STEERING ALIGNMENT (REF. FIG. 403).

- (3) Install bearing halves in forward and aft collars (Ref. Fig. 402).
- (4) Coat inner surfaces of bearings and mating chrome plated surface of strut with grease.
- (5) Install collars on strut and insert steering collar pins in both sides. Install conduit support and spacer on right side.

EFFECTIVITY: ALL

001B

32-51-10
Page 407
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL

- (6) Secure pins with bolts, washers, caps, and retaining nuts.
- (7) Safety left retaining nut with MS24665-155 cotter pin.
- (8) Rotate steering collar assembly around strut to check for binding. Any binding is cause for collar assembly removal to determine reason for binding.
- (9) Position steering assembly to mate with aft steering collar; coat with grease and insert both upper steering plate center steering pins.
- (10) Coat with grease and insert both lower steering plate center pins.
- (11) Secure upper and lower center pins with bolts, washers, caps, and nuts. Safety nuts with cotter pins.
- (12) Install steering cable in steering collar cable groove; secure in place with retainer and bolts. Safety bolts with lock-wire.
- (13) Coat with grease and insert remaining upper steering plate steering pins.

R CAUTION: WHEN INSTALLING CABLE GUARDS, CARE MUST BE EXERCISED TO ENSURE THAT TAB IS POSITIONED IN SUCH A MANNER THAT CABLE IS HELD IN CABLE GROOVE.

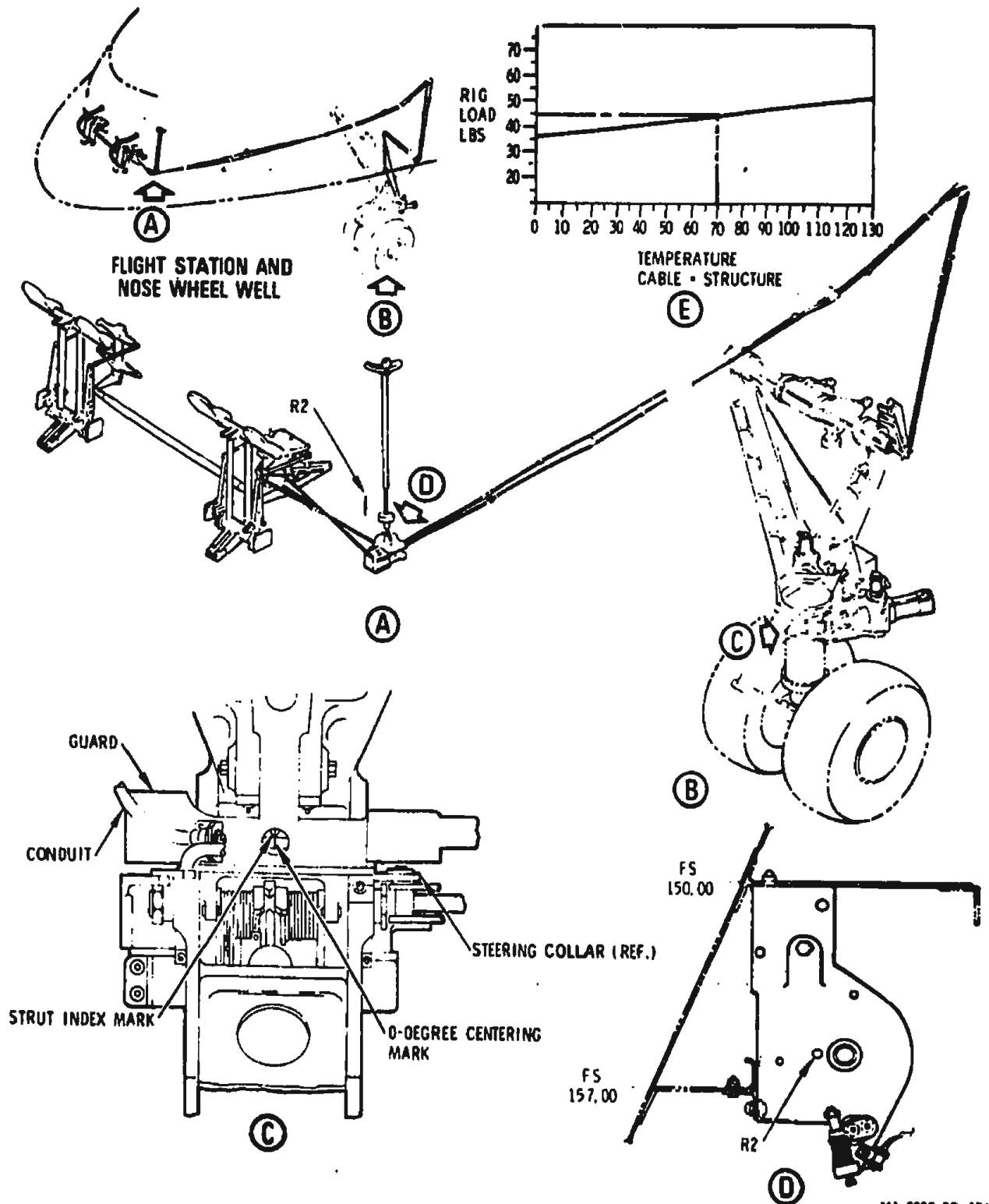
- (14) Secure pins with bolts, cable guards, caps, washers, and nuts. Safety nuts with cotter pins.
- (15) Coat with grease and insert remaining lower steering plate steering pins.
- (16) Secure pins with bolts, caps, washers, and nuts. Safety nuts with cotter pins.
- (17) Align right steering actuator bearing with aft steering collar bearings; coat with grease and insert actuator pin.
- (18) Align conduit support and secure pin and conduit support with bolt, washers, cap, and nut. Safety nut with cotter pin.
- (19) Align left steering actuator bearing with aft steering collar bearings; coat with grease and insert actuator pin.

EFFECTIVITY: ALL

001B

32-51-10
Page 408
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



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Nose Landing Gear Steering Alignment
Figure 403

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0018 EFFECTIVITY: ALL

32-51-10
Page 409
Mar 15/84



- (20) Secure pin with bolt, washers, cap, and nut. Safety nut with cotter pin.
- (21) Tighten and safety steering collar right pin retaining nut with cotter pin.
- (22) Connect pressure and return hydraulic lines to steering valve (Ref. Fig. 401).
- (23) Position upper torque arm to match lugs on forward steering collar. Coat bolt with grease and secure torque arm with bolt, washers, and nut.
- (24) Safety nut with cotter pin.
- (25) Disconnect upper torque arm from lower torque arm.
- (26) Verify that steering cable is correctly routed and not fouled against structure or assemblies.
- (27) In left ECS compartment, connect upper steering cables to lower steering cables at turnbuckles. Do not tighten cables more than is required to hold cables in position. Remove bungee cords.
- (28) In forward electronic service center, zone 112, install handwheel input cable drum rig pin R2 (Ref. Fig. 403).
- (29) In left ECS compartment, alternately tighten turnbuckles to obtain correct cable tension. Use chart to obtain correct tension. Do not allow a tension differential between cables of more than 4 lbs during adjustment.

Cable tension at ambient temperature of 70 degrees Fahrenheit (21°C) is 45 (± 2.5) lbs.
- (30) Ensure that nose gear is centered so that 0-degree centering mark on bearing is aligned with strut index mark. If nose gear is not centered, adjust turnbuckles alternately to obtain center condition.
- (31) Check and readjust cables as required.
- (32) Remove rig pin installed in Step (28).



MAINTENANCE MANUAL

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (33) Turn on hydraulic system C pressure (Ref. 29-11-00).
- (34) Turn on electrical power (Ref. 24-00-00).
- (35) Bleed hydraulic system using bleed valves on steering valve (Ref. 32-51-05, Fig. 401).
- (36) Verify that upper torque arm is clear of lower torque arm; using hand steering wheel, slowly cycle nose steering system fully to both sides eight to ten times while checking to ensure that conduit does not interfere with moving steering assembly.
- (37) Center steering wheel and verify that nose gear is centered. Adjust turnbuckles as required with rig pin R2 in cable drum.
- (38) Remove rig pin if installed.
- (39) Remove outboard steering pin nuts and install conduit guard. Tighten nuts and safety with cotter pins.
- (40) Install clamp and conduit bracket.
- (41) Bleed air from hydraulic system C reservoir (Ref. 29-11-00).
- (42) Install ECS compartment access door 117AL.
- (43) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (44) Turn off electrical power (Ref. 24-00-00).
- (45) Lubricate all bearings (Ref. 12-24-21).
- (46) Coat all exposed bolt threads with low adhesion sealing compound (Ref. 20-51-04).

R EFFECTIVITY: ALL

001B

32-51-10
Page 411/412
Mar 15/84

LOCKHEED
MAINTENANCE MANUAL

NOSE LANDING GEAR STEERING PLATE - REMOVAL AND INSTALLATION

1. Equipment and Materials

- R Grease, Ref. MM 12-20-00, Lubrication, Scheduled Servicing**
Cotter pin, MS24665-155, or equivalent
Cotter pin, MS24665-153, or equivalent

2. Referenced Procedures

- | | |
|-----------------|---|
| 12-24-21 | Nose Landing Gear Lubrication |
| 24-00-00 | Electrical Power - Maintenance Practices |
| 29-11-00 | Hydraulic Power System - Maintenance Practices |
| 32-51-02 | Nose Landing Gear Steering Actuator - Removal and Installation |
| 32-51-05 | Nose Landing Gear Steering Trunnion Valve - Removal and Installation |
| 32-51-06 | Nose Landing Gear Steering Valve Assembly - Removal and Installation |

3. Removal/Installation

A. Removal

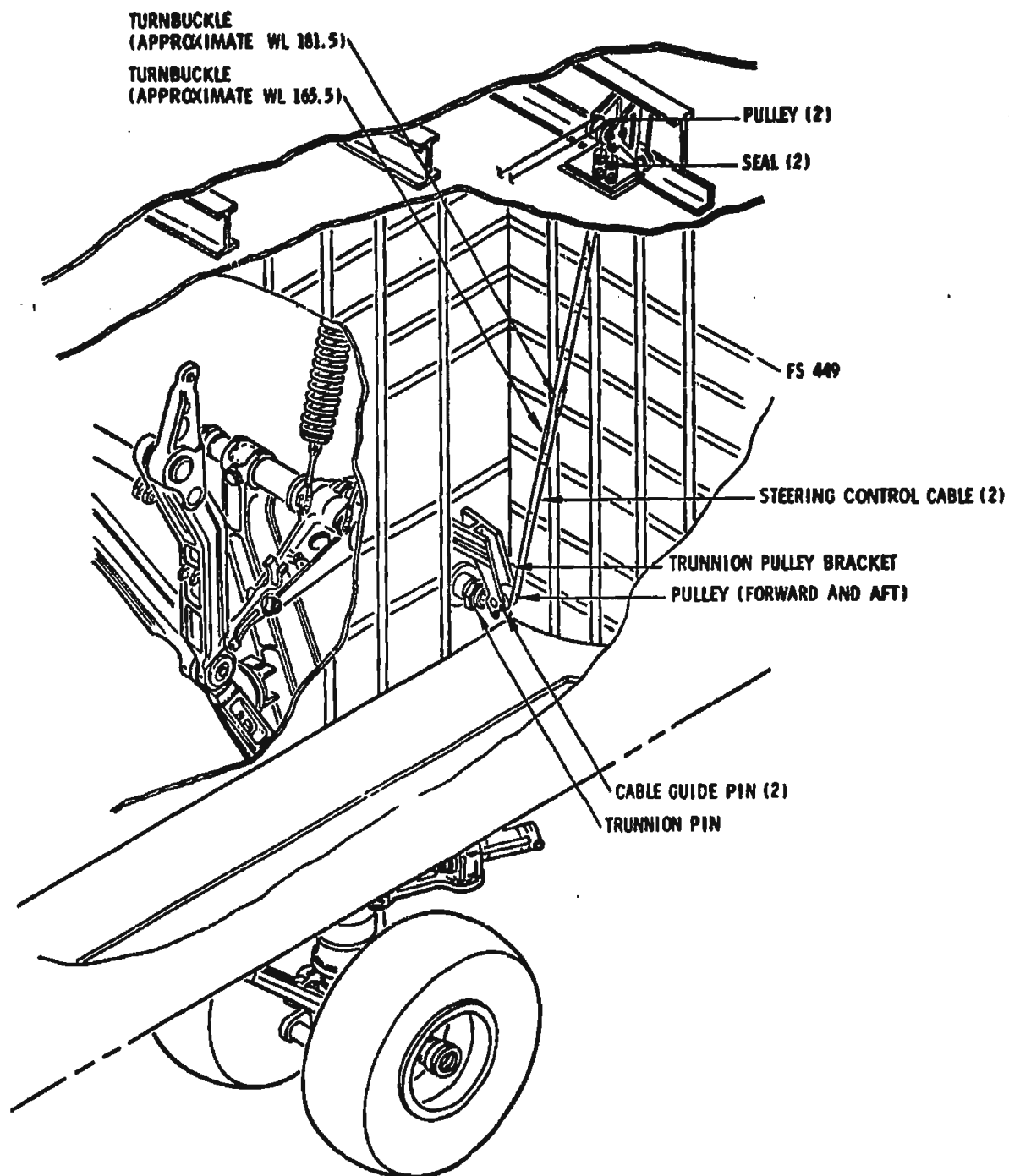
- (1) Remove both nose landing gear (NLG) steering actuators (Ref. 32-51-02).**
- (2) Remove both NLG steering trunnion valves (Ref. 32-51-05).**
- (3) Remove NLG steering valve assembly (Ref. 32-51-06).**
- (4) Open left environmental control system (ECS) compartment access door 117AL.**
- (5) Secure steering cables above turnbuckles to prevent cable slack when cables are disconnected (Ref. Fig. 401).**
- (6) Disconnect both steering cables at turnbuckles.**

EFFECTIVITY: ALL

32-51-11
Page 401
Dec 15/93

001B

LOCKHEED
MAINTENANCE MANUAL



M1-0103-32-141

R
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Nose Landing Gear Steering Control Cables Disconnect
Figure 401

EFFECTIVITY: ALL

001B

32-51-11
Page 402
Nov 15/75

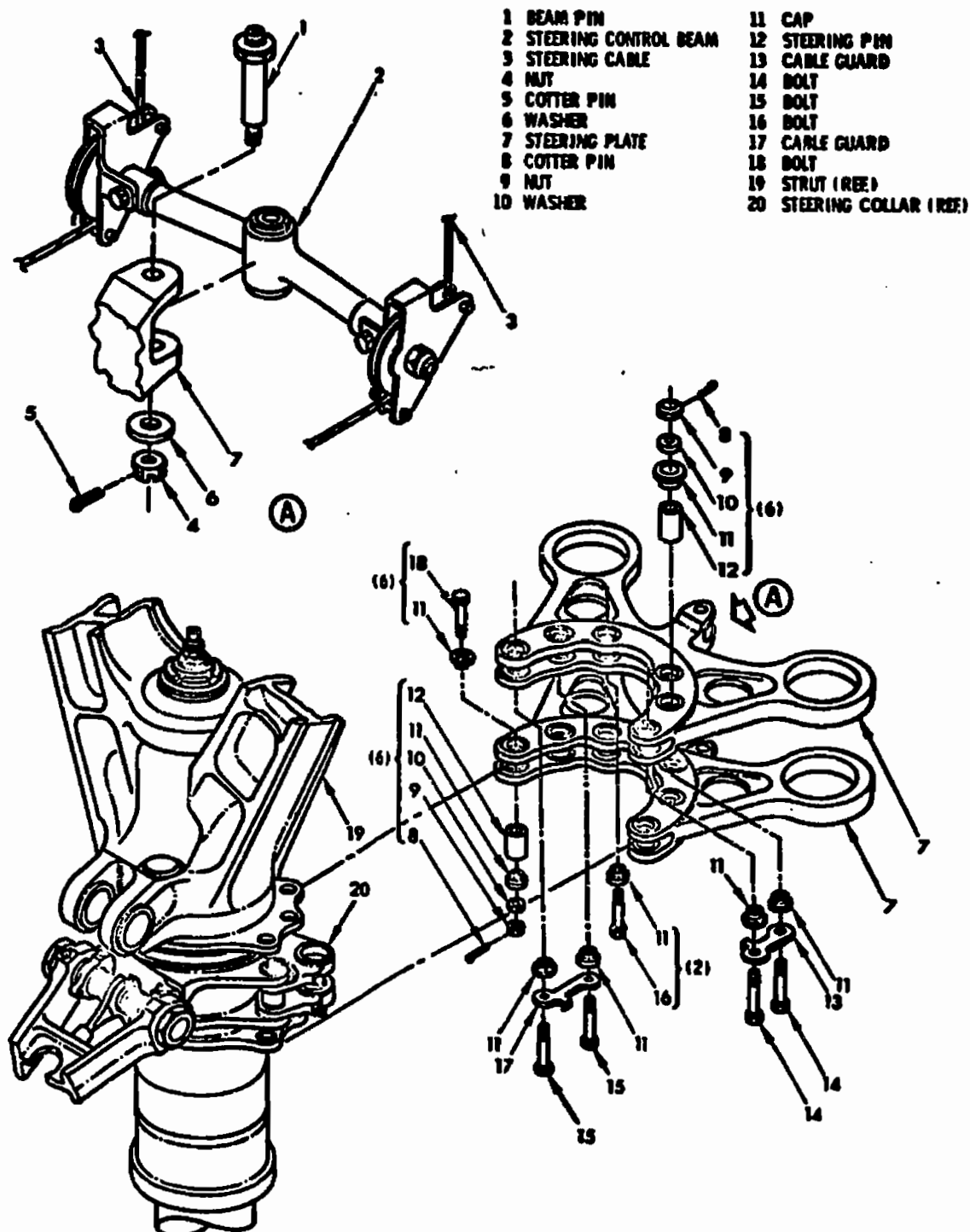
LOCKHEED
MAINTENANCE MANUAL

- R (7) Remove bolt securing steering control beam to steering
R plate (Ref. Fig. 402).
- R (8) Pull enough slack into steering cables to remove beam
R from steering plate; remove beam and secure clear of
R steering plate.
- R (9) Remove clamp and conduit bracket from conduit guard
R (Ref. Fig. 403).
- R (10) Remove nut from both outboard steering pin bolts in
R upper steering plate.
- R (11) Remove conduit guard.
- R NOTE: When removing the bolts and steering pins
R securing the steering plates to the steering
R collar, it will be necessary to rotate the
R steering collar in order to provide clearance.
- R (12) Remove remaining bolts and pins securing upper steering
R plate and remove plate (Ref. Fig. 402).
- R (13) Remove bolts and pins securing lower steering plate and
R remove plate.
- R B. Installation
- R (1) Coat outside surfaces of steering pins with grease.
- R (2) Position lower steering plate to steering collar (Ref.
R Fig. 402).
- R NOTE: When installing the bolts and steering pins
R securing the steering plates to the steering
R collar, it will be necessary to rotate the
R steering collar in order to provide clearance.
- R (3) Install steering pins, caps, bolts, washers, and nuts.
- R (4) Safety nuts with MS24665-153 cotter pins.
- R (5) Position upper steering plate to steering collar.
- R (6) Install both inboard steering pins, caps, bolts,
R washers, and nuts.
- R (7) Install remaining pins, cable guards, caps, washers,
R and nuts in pairs so that cable guards prevent cable
R from coming out of steering collar cable groove. Do
R not install conduit guard.

R EFFECTIVITY: ALL
R
001E

32-51-11
Page 403
Aug 15/74

LOCKHEED
MAINTENANCE MANUAL



HL-0100-32-409

Nose Landing Gear Steering Plate - Removal and Installation
Figure 402

EFFECTIVITY: ALL

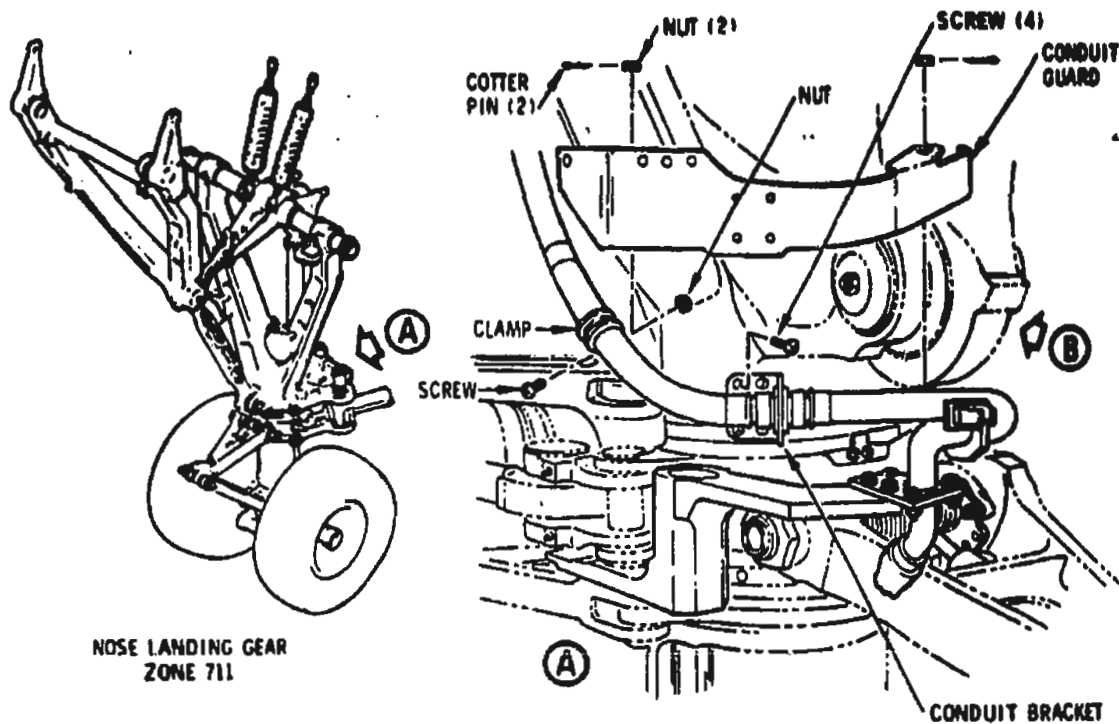
32-51-11

Page 404
Aug 15/74

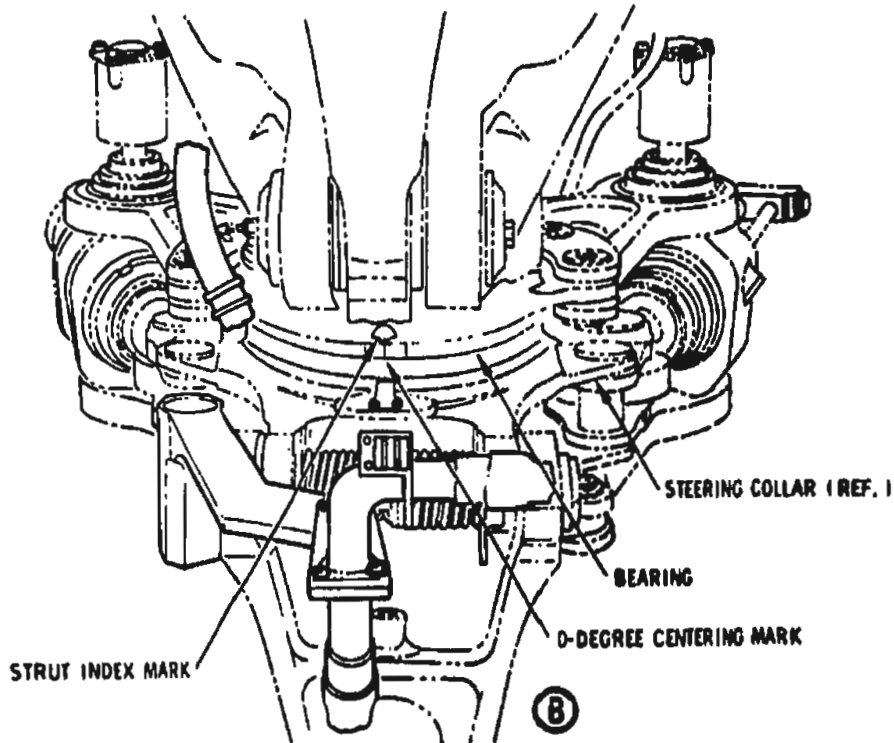
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LOCKHEED
MAINTENANCE MANUAL



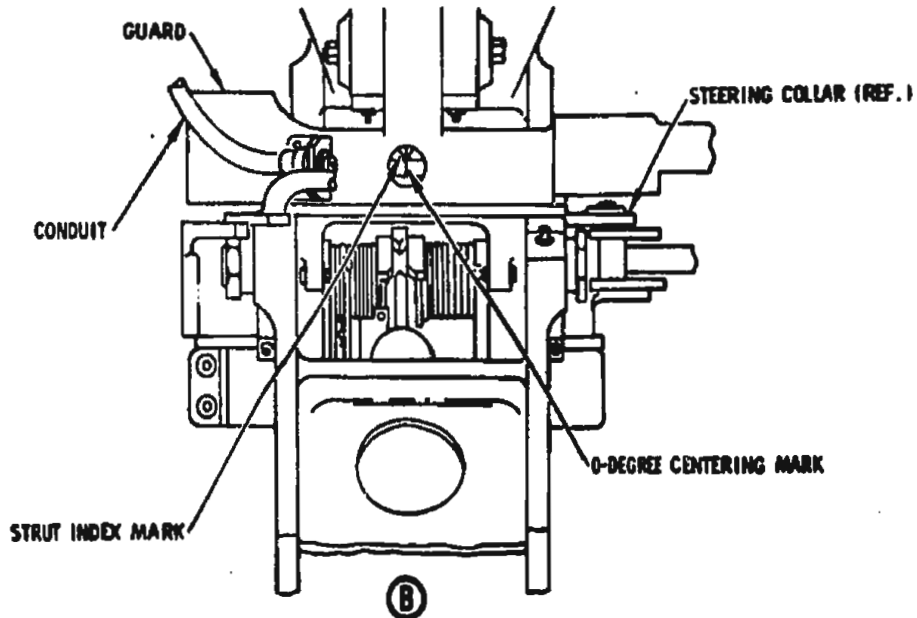
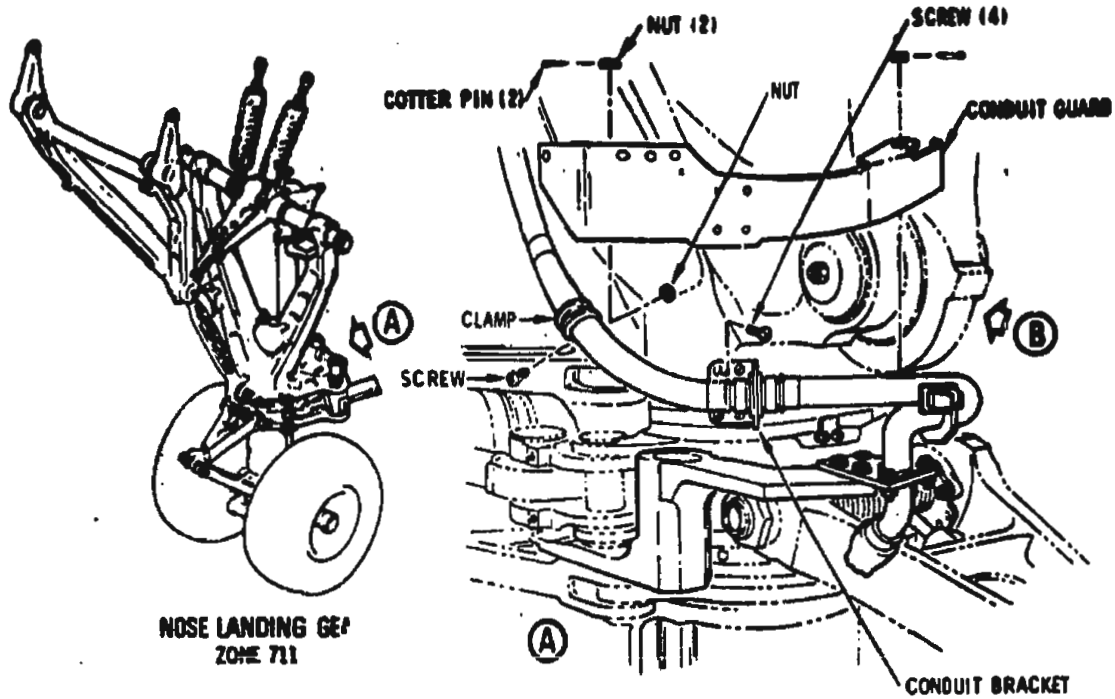
NOSE LANDING GEAR
ZONE 711



M1-0100-32-438

Nose Gear Steering Indexing and Marking
Figure 403

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-098

Nose Gear Steering Indexing and Marking
Figure 403

R EFFECTIVITY: 001-031 WITH SB32-094 AND 032-999
R
001B

32-51-11
Page 406
Jul 15/84



MAINTENANCE MANUAL

- (8) Safety inboard and mid nuts with MS24665-153 cotter pins. Do not safety outboard nuts.
- (9) Secure steering control beam to upper plate with bolt, washer, and nut.
- (10) Safety nut with MS24665-155 cotter pin.
- (11) Ensure that steering cables are routed correctly and all excess slack is removed.
- (12) Connect upper steering cables to lower steering cables at turnbuckles. Do not tighten cables more than is required to hold cables in position (Ref. Fig. 401).
- (13) Install NLG steering valve assembly (Ref. 32-51-06). Do not turn on hydraulic pressure, bleed air, or perform steering system adjustment and test.
- (14) Install both NLG steering trunnion valves (Ref. 32-51-05). Do not turn on hydraulic pressure, bleed air, or cycle steering assembly.
- (15) Install both NLG steering actuators (Ref. 32-51-02). Do not turn on hydraulic pressure, bleed air, join upper and lower torque arms, or check steering travel.
- (16) Verify that upper torque arm is not connected to lower torque arm.
- (17) In forward electronic service center, zone 112, install hand wheel input cable drum rig pin R2 (Ref. Fig. 404).
- (18) In left ECS compartment alternately tighten turnbuckles to obtain correct cable tension. Use chart to obtain correct tension. Do not allow a tension differential between cables of more than 4 lbs during adjustment.

Cable tension at ambient temperature of 70 degrees Fahrenheit (21°C) is 45 (±2.5) lbs..
- (19) Ensure that nose gear is centered so that 0-degree centering mark on bearing is aligned with strut index mark (Ref. Fig. 403). If nose gear is not centered, adjust turnbuckles alternately to obtain centered condition.
- (20) Check and readjust cable tension as required.
- (21) Remove rig pin R2 installed in Step 3B(17).

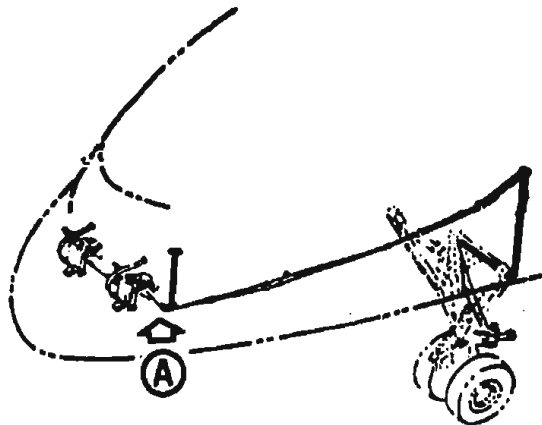
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EFFECTIVITY: ALL

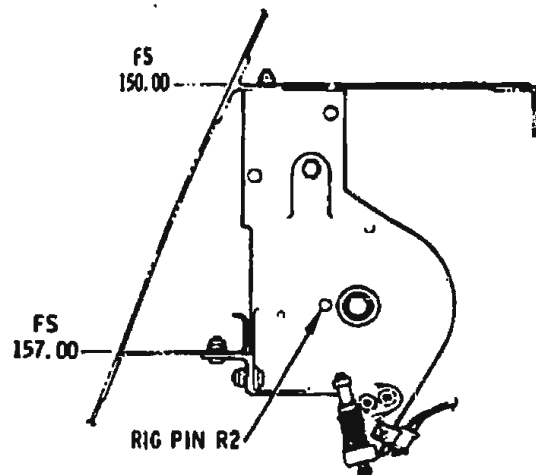
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32-51-11
Page 407
Nov 15/82

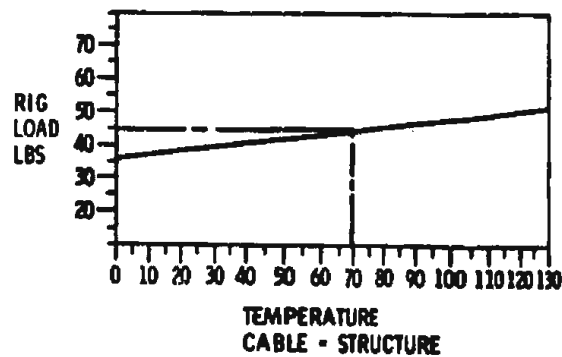
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MAINTENANCE MANUAL



FLIGHT STATION AND
NOSE WHEEL WELL



①
HAND WHEEL INPUT CABLE DRUM
ZONE 112



M1-0002-32-470

Hand Wheel Input Cable Drum Rig Pin Location
Figure 404

R EFFECTIVITY: ALL
R
001B

32-51-11
Page 408
Mar 15/84



MAINTENANCE MANUAL

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (22) Turn on hydraulic system C pressure (Ref. 29-11-00).
- (23) Turn on electrical power (Ref. 24-00-00).
- (24) Bleed hydraulic system using bleed valves on steering valve (Ref. 32-51-05, Fig. 401).
- (25) Verify that upper torque arm is clear of lower torque arm; using hand steering wheel, slowly cycle nose steering system fully to both sides eight to ten times to clear any air from hydraulic system.
- (26) Center steering wheel and verify that nose gear is centered. Adjust turnbuckles as required with rig pin R2 in cable drum.
- (27) Remove rig pin if installed.
- (28) Remove outboard steering pin nuts and install conduit guard. Tighten nuts and safety with MS24665-153 cotter pins.
- (29) Install clamp and conduit bracket.
- (30) Bleed air from hydraulic system C reservoir (Ref. 29-11-00).
- (31) Install ECS compartment access door 117AL.
- (32) Turn off hydraulic system C pressure (Ref. 29-11-00).
- (33) Turn off electrical power (Ref. 24-00-00).
- (34) Lubricate all bearings (Ref. 12-24-21).

R
R**NOSE STEERING CABLE DRUM ASSEMBLY
REMOVAL AND INSTALLATION****R 1. Equipment and Materials****R Bungees, 1/4-inch diameter, or equivalent****R 2. Referenced Procedures****R 32-51-00 Nose Gear Steering System - Adjustment and Test****R 32-51-13 Nose Gear Steering Force Sensor - Removal and
R Installation****R 3. Removal/Installation****R A. Removal****R (1) On Flight Engineer/Second Officers overhead circuit
R breaker panel CB2, zone 215, open and tag circuit
R breaker GEAR NOSE STEERING (F19).****R (2) On aircraft 001-006,
R at terminal board TB238 accessible through console
R assembly opening, left side wall, FS182, disconnect
R displacement switch wires.****R (2) On aircraft 007-999,
R locate splices 3299-SP1 and 3299-SP2, accessible
R through console assembly opening at FS150, WL190 and
R LBL50, and disconnect displacement switch wires.****R (3) In forward electronic service center (FESC), attach
R bungees to cables aft of turnbuckles aft of nose
R steering cable drum assembly and attach to Structure
R Forward.****R NOTE: Purpose of bungees is to maintain tension on
R nose gear steering cables aft of cable drum.****R (4) Disconnect nose steering cables at turnbuckles aft of
R nose steering cable drum assembly.****R (5) Disconnect nose steering cable turnbuckle between nose
R steering cable drum assembly and rudder pedal steering
R mechanism cable drum.**R
R

EFFECTIVITY: ALL

001B



MAINTENANCE MANUAL

- (6) Disconnect nose wheel steering force sensor from nose steering cable drum assembly (Ref. 32-51-13).

NOTE: It is not necessary to disconnect force sensor electrical wires.

- (7) Remove pin or bolt (as applicable) from nose steering cable drum assembly adjacent to the pulley and remove cable.
- (8) Remove nose steering cable drum assembly.

B. Installation

- (1) Remove pin or bolt (as applicable) from nose steering cable drum assembly adjacent to pulley.
- (2) Place nose steering cable drum assembly near installed location and route nose steering cable through the assembly around the pulley.
- (3) Install nose steering cable drum assembly with bolts, nuts and washers (four places).
- (4) Install pin or bolt (as applicable) in nose steering cable drum adjacent to pulley.
- (5) Attach nose steering cable turnbuckle between nose steering cable drum assembly and rudder pedal steering mechanism cable drum.
- (6) Attach nose steering cables at turnbuckles aft of nose steering cable drum assembly.
- (7) Remove bungees from nose steering cables.
- (8) Attach nose wheel steering force sensor to nose steering cable drum assembly (Ref. 32-51-13).
- (9) Verify on Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker GEAR NOSE STEERING (F19).
- (10) On aircraft 001-006,
at terminal board TB238, attach displacement switch wires.
- (10) On aircraft 007-999,
attach displacement switch wires at splices 3299-SP1 and 3299-SP2.
- (11) Close access panels.

EFFECTIVITY: ALL

001B

32-51-12
Page 402
Dec 15/91

LOCKHEED



MAINTENANCE MANUAL

(12) Rig nose gear steering system (Ref. 32-51-00).

R
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001B

EFFECTIVITY: ALL

32-51-12
Page 403/404
Dec 15/91

**NOSE GEAR STEERING FORCE SENSOR - REMOVAL AND INSTALLATION****1. General**

The nose wheel steering force sensor is removed and installed as a single unit. The steering wheel and related shaft tube assembly are not removed.

2. Referenced Procedures

- 23-51-09 Headset Stowage and Microphone Selector Console Assembly - Removal and Installation
- 32-51-16 Nose Gear Steering Force Sensor Switch - Adjustment and Test

3. Removal/Installation**A. Removal**

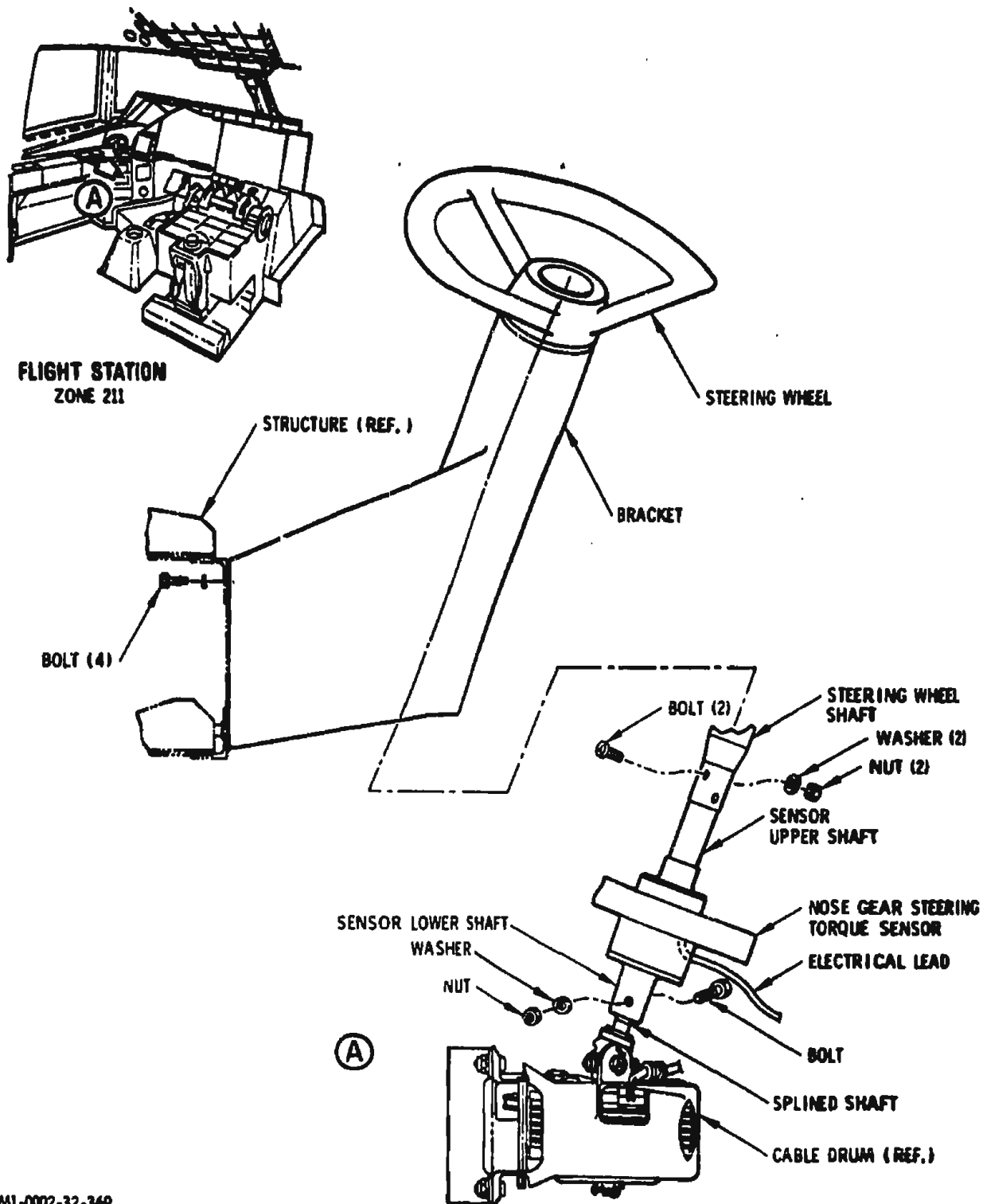
- (1) Remove headset stowage and microphone selector console assembly (Ref. 23-51-09).
- (2) On Flight Engineer/Second Officers overhead circuit panel CB2, open and tag circuit breaker NOSE STEERING (F19).
- (3) Using access provided by procedure in Step 3A(1), remove bolts securing bracket to structure (Ref. Fig. 401).
- (4) At terminal board TB238 located in zone 211, left side wall, FS 230, disconnect wire 3251-6B22V from terminal B of module 19 and wire 3251-8A22V from terminal A of module 20. Tag wires for installation.
- (5) Free wires from clamps so that wires are clear to be removed with sensor.
- (6) Remove bolt, nut, and washer securing sensor lower shaft to cable drum.
- (7) Mark sensor upper shaft and steering wheel shaft for indexing during installation.
- (8) Remove bolts securing sensor upper shaft to steering wheel shaft.

EFFECTIVITY: ALL

001B

32-51-13
Page 401
Mar 15/84

LOCKHEED
MAINTENANCE MANUAL



M1-0002-32-369

Nose Gear Steering Force Sensor - Removal and Installation
Figure 401

EFFECTIVITY: ALL

0018

32-51-13
Page 402
Mar 15/84



MAINTENANCE MANUAL

- (9) Pull steering wheel shaft upward until clear of sensor upper shaft.
- (10) Remove sensor assembly.

B. Installation

NOTE: Prior to installing sensor, adjustment and test procedure (Ref. 32-51-16) must be performed.

- (1) Insert sensor assembly through access provided by procedures in Step 3A(1). Fit sensor lower shaft over cable drum splined shaft.
- (2) Install bolt, washer, and nut.
- (3) Lower bracket and steering wheel shaft so that index marks on shaft and sensor upper shaft are aligned. Fit steering wheel shaft onto sensor upper shaft.
- (4) Install bolts, washers, and nuts.
- (5) Install bracket with bolts and washers to structure.

CAUTION: WIRES WHICH ARE NOT PROPERLY SUPPORTED AND ROUTED ARE SUBJECT TO CHAFING AND STRAIN WHICH MAY LEAD TO WIRE BREAKAGE.

- (6) Route wires to terminal board TB238, and connect wire 3251-6B22V to terminal B of module 19 and wire 3251-8A22V to terminal A of module 20. Remove tags as required.
- (7) Verify that wires are properly clamped and routed to prevent chafing against surrounding structure and to prevent strain due to wire being stretched during steering movement.
- (8) Secure wires with clamps.
- (9) Install console assembly removed in Step 3A(1) (Ref. 23-51-09).
- (10) Close circuit breaker opened in Step 3A(2) and remove tag.

EFFECTIVITY: ALL

001B

32-51-13
Page 403/404
Mar 15/84



**NOSE GEAR STEERING CABLE DRUM DISPLACEMENT SWITCH
REMOVAL AND INSTALLATION**

1. Equipment and Materials

Wrench, 0.125-inch nut size, or equivalent

Wrench, 0.088 to 0.095-inch nut size, or equivalent

2. Referenced Procedures

23-51-09 Headset Stowage and Microphone Selector Console
Assembly - Removal and Installation

32-51-15 Nose Gear Steering Cable Drum Displacement Switch -
Adjustment and Test

3. Removal/Installation

A. Removal

- (1) Remove headset stowage and microphone selector console assembly (Ref. 23-51-09).
- (2) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker NOSE STEERING (F19).
- (3) On aircraft 001-031 without SB32-094, proceed as follows (Ref. Fig. 401):
 - (a) On aircraft 001-006,
at terminal board TB 238, accessible through console assembly opening, left side wall, FS 182, disconnect wire 3251-8B22V from TB238-20B and wire 3251-4B22V from TB238-20A; free wires from restraints.
 - (a) On aircraft 007-031,
disconnect wires 3251-8B22V and 3251-4B22V from cable drum displacement switch.
 - (b) On aircraft 001-006,
remove bolts securing plate to drum.
 - (c) Remove nuts securing switch to plate and remove switch.

EFFECTIVITY: ALL

001B

32-51-15
Page 401
Mar 15/84



MAINTENANCE MANUAL

R

- (3) On aircraft 001-031 with SB32-094 and 032-999, proceed as follows (Ref. Fig. 401):

- (a) Disconnect wires 3251-8B22V and 3251-4B22V from cable drum displacement switch.
- (b) Remove nuts securing U-bolt to drum assembly.
- (c) Remove U-bolt, actuator, and switch.
- (d) Remove switch from U-bolt.

B. Installation

- (1) Verify that circuit breaker opened in Step A(2) is open and tagged.

CAUTION: TO PREVENT DAMAGE TO THE CABLE DRUM DISPLACEMENT SWITCH, NUT TORQUE MUST BE LIMITED TO 5 LB IN.

- (2) On aircraft 001-031 without SB32-094, proceed as follows:

- (a) Position switch on studs, install nuts finger tight, and alternately tighten nuts until switch is firmly held in place.
- (b) On aircraft 001-006, install bolts securing plate to drum.
- (c) On aircraft 001-006, at terminal board TB238, connect wire 3251-8B22V to TB238-20B and wire 3251-4B22V to TB238-20A. Verify that wires are properly routed and supported to prevent chafing and breakage.
- (c) On aircraft 007-031, connect wires 3251-8B22V and 3251-4B22V to cable drum displacement switch.

R

- (2) On aircraft 001-031 with SB32-094 and 032-999, proceed as follows (Ref. Fig. 401):

- (a) Position actuator and switch on U-bolt.
- (b) Mount the above assembly on the cable drum housing. Take care to properly set the switch actuator roller on the cable drum cam rim.
- (c) Install U-bolt, switch, and actuator to drum assembly.

EFFECTIVITY: ALL

001B

32-51-15
Page 402
Jul 15/84

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MAINTENANCE MANUAL

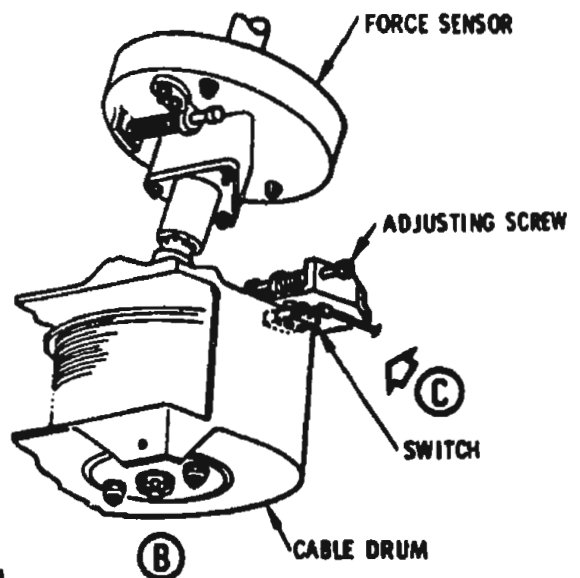
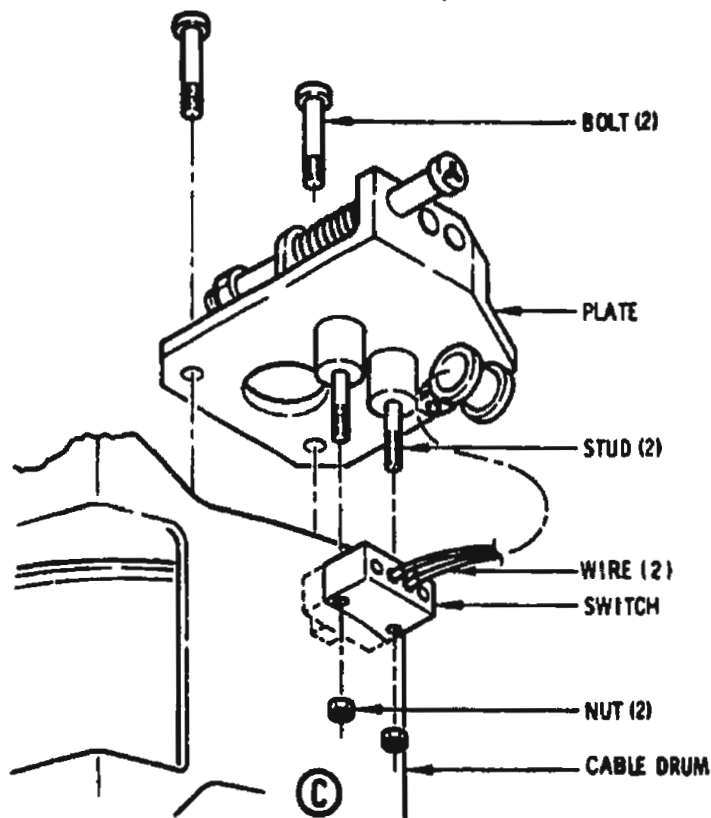
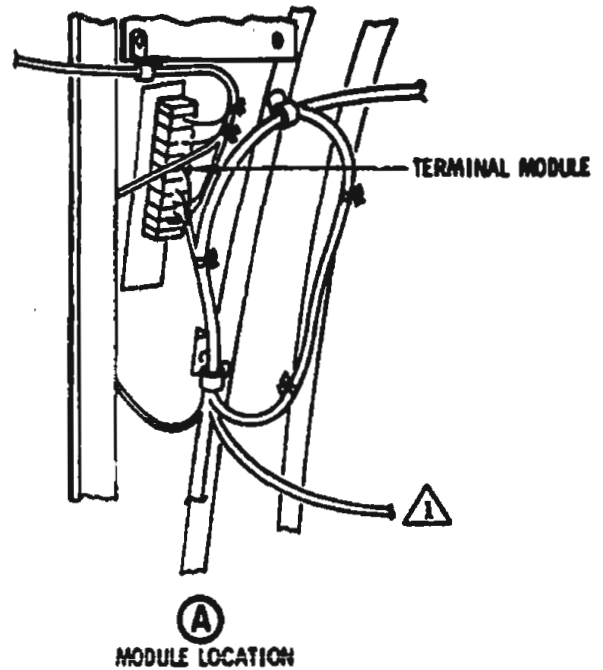
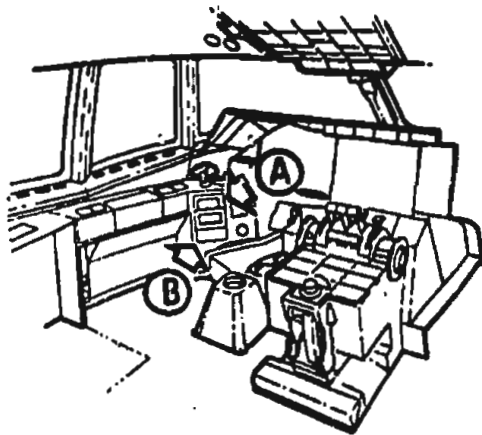
- (d) Secure with nuts.
- (e) Connect wires 3251-8B22V and 3251-4B22V to switch.
- (3) Remove tag and close circuit breaker opened in Step 3A(2).
- (4) Perform switch adjustment and test (Ref. 32-51-15).

EFFECTIVITY: ALL

001B

32-51-15
Page 403
Mar 15/84

LOCKHEED
MAINTENANCE MANUAL



NOTE
⚠ VERIFY THAT WIRES ARE PROPERLY ROUTED AND SUPPORTED TO PREVENT CHAFING AND BREAKAGE

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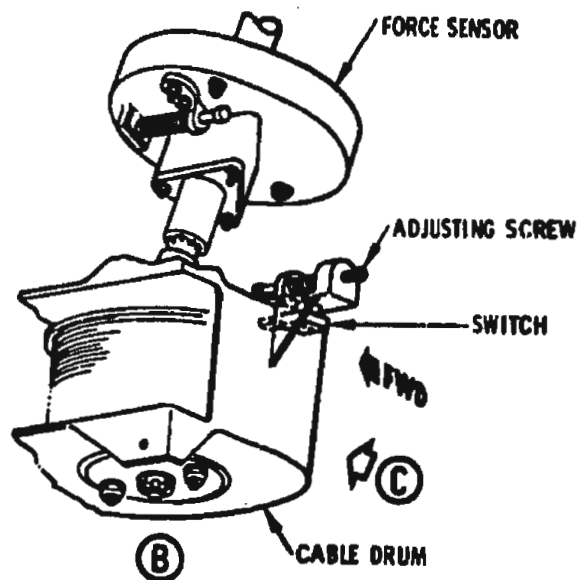
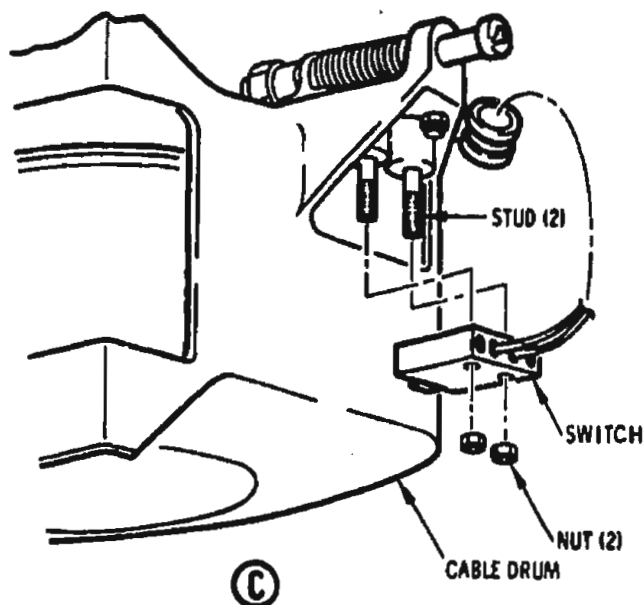
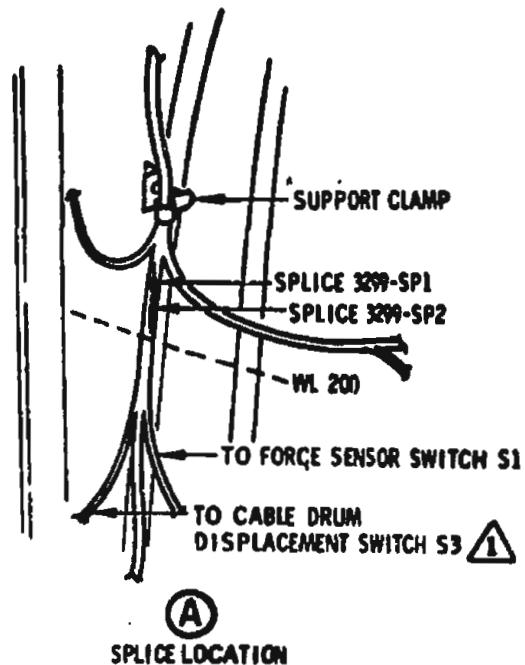
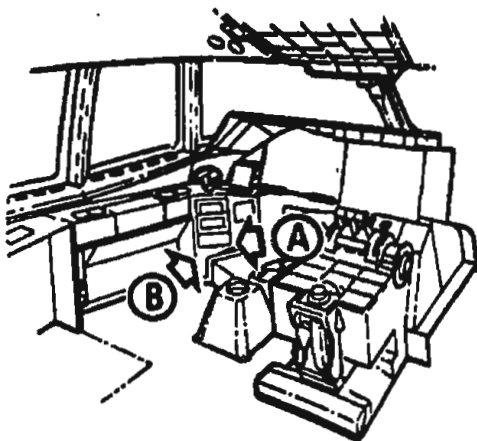
Nose Gear Steering Cable Drum Displacement Switch
Removal and Installation
Figure 401

EFFECTIVITY: 001-006 WITHOUT SB32-094

001B

32-51-15
Page 404
Mar 15/84

LOCKHEED
MAINTENANCE MANUAL



NOTE
1 VERIFY THAT WIRES ARE PROPERLY ROUTED AND SUPPORTED TO PREVENT CHAFING AND BREAKAGE

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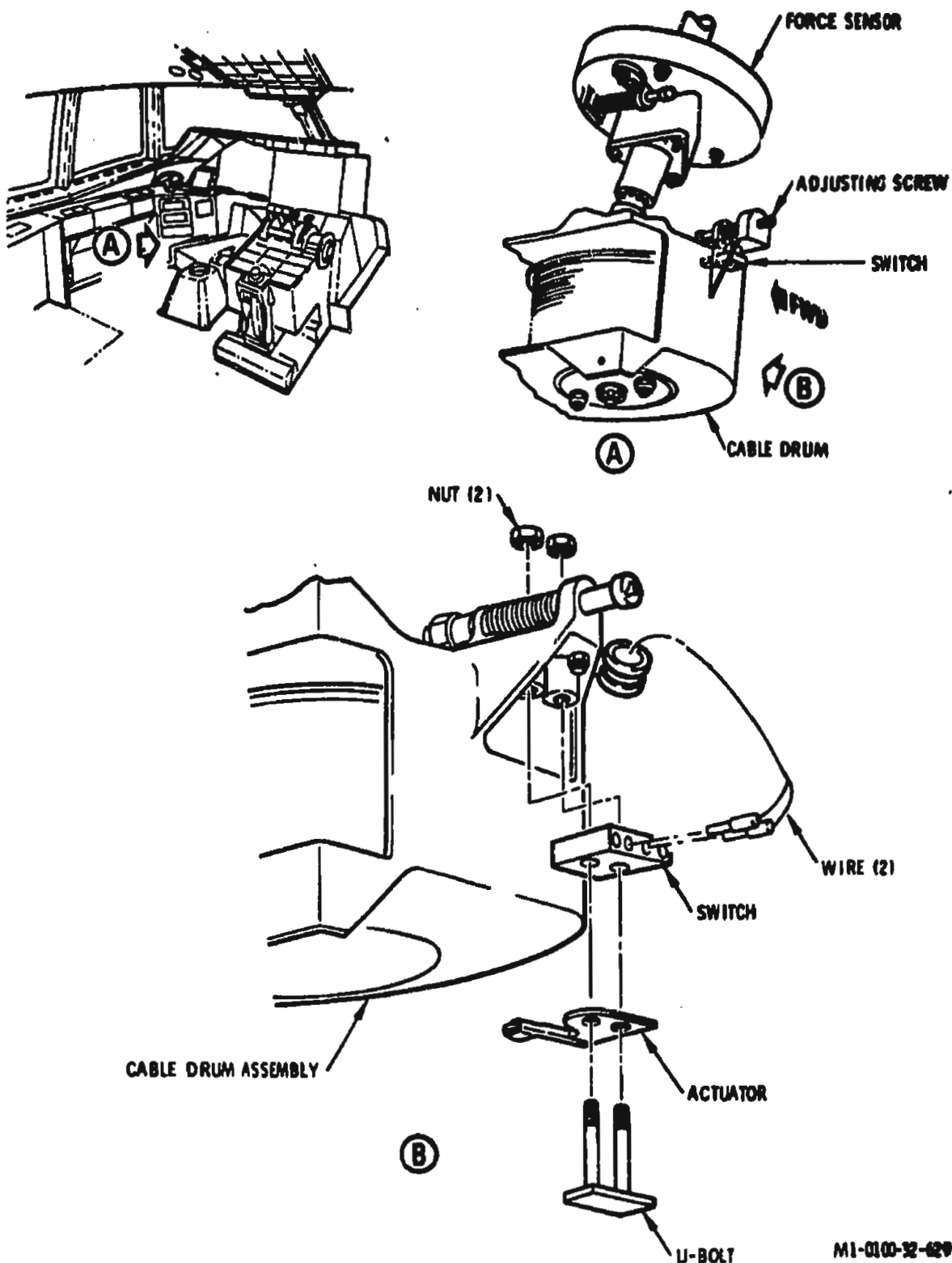
Nose Gear Steering Cable Drum Displacement Switch
Removal and Installation
Figure 401

EFFECTIVITY: 007-031 WITHOUT SB32-094

001B

32-51-15
Page 405
Mar 15/84

LOCKHEED
MAINTENANCE MANUAL



MI-0100-32-629

Nose Gear Steering Cable Drum Displacement Switch
Removal and Installation
Figure 401

001B EFFECTIVITY: 001-031 WITH SB32-094 AND 032-999

32-51-15
Page 406
Jul 15/84

LOCKHEED
MAINTENANCE MANUAL

NOSE GEAR STEERING CABLE DRUM DISPLACEMENT SWITCH
ADJUSTMENT AND TEST

1. Equipment and Materials

Multimeter, Simpson 260, or equivalent

Index Pointer, locally fabricated

Protractor, locally modified

2. Referenced Procedures

23-51-09 Headset Stowage and Microphone Selector Console
 Assembly - Removal and Installation

29-11-00 Hydraulic Power System - Maintenance Practices

3. Adjustment/Test

A. Adjustment

- (1) Disconnect nose landing gear (NLG) torque arms at apex. Raise upper torque arm until clear of lower torque arm and positioned in detent.
- (2) Remove headset stowage and microphone selector console assembly (Ref. 23-51-09).
- (3) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, open and tag circuit breaker NOSE STEERING (F19).

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY
HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY
DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL
FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL
AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT
HYDRAULIC PRESSURE.

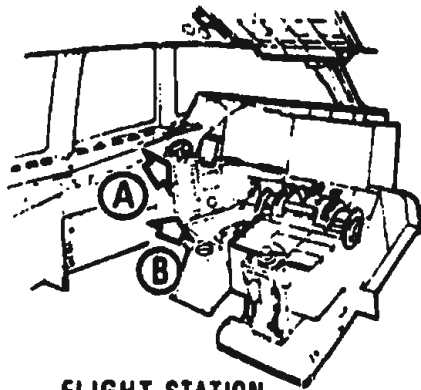
- (4) Turn on hydraulic system C pressure (Ref. 29-11-00).

EFFECTIVITY: ALL

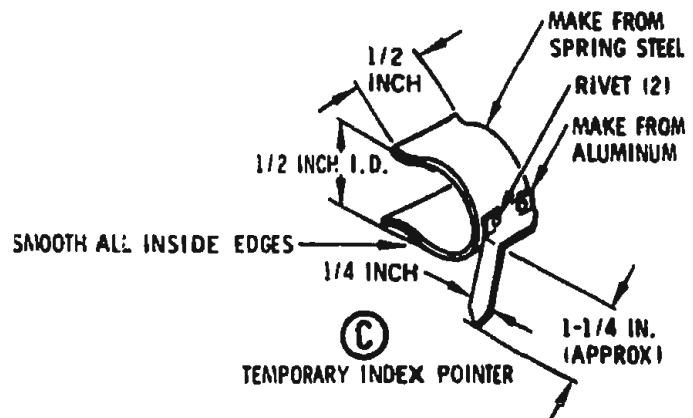
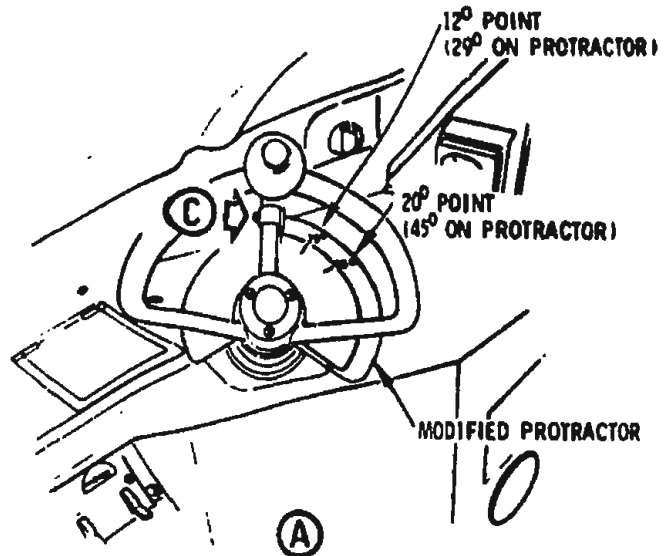
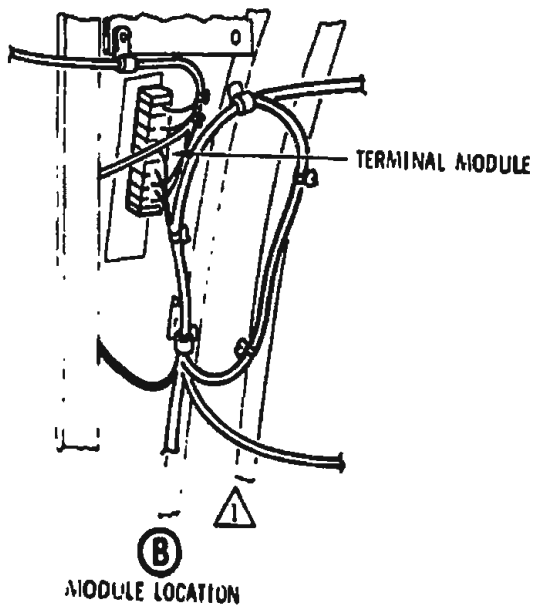
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32-51-15
Page 501
Mar 15/84

LOCKHEED
MAINTENANCE MANUAL



FLIGHT STATION
ZONE 211



M1-0003-32-524

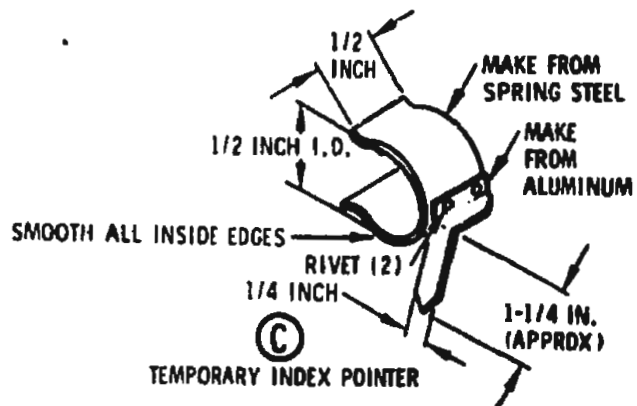
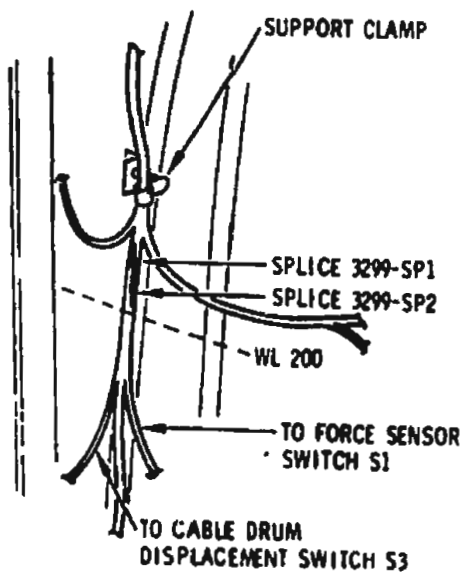
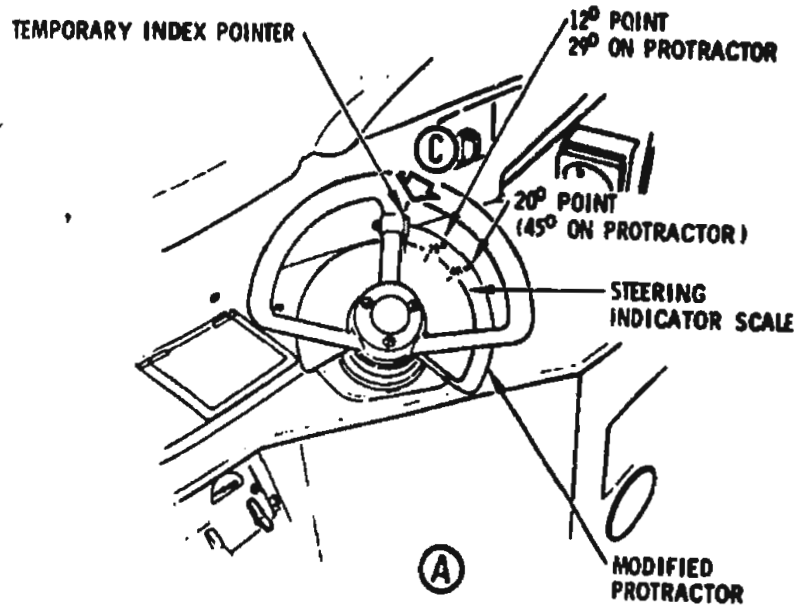
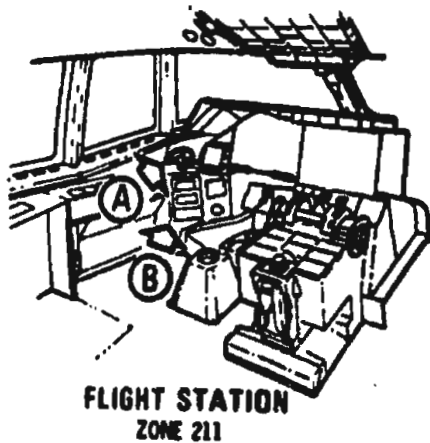
Nose Gear Steering Cable Drum Displacement Switch
Adjustment and Test
Figure 501

EFFECTIVITY: 001-006

001B

32-51-15
Page 502
Mar 15/84

LOCKHEED
MAINTENANCE MANUAL



MI-0005-32-370

**Nose Gear Steering Cable Drum Displacement Switch
Adjustment and Test
Figure 501**

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001B

EFFECTIVITY: 007-999

32-51-15
Page 503
Jul 15/84



MAINTENANCE MANUAL

- (5) Snap locally fabricated index pointer (Ref. Fig. 501) on center spoke of steering wheel with pointer on right side of spoke.
- (6) With steering handwheel centered (0 degree), position locally modified protractor on steering indicator scale and align 0-degree mark on protractor with point of index pointer. Secure protractor to steering indicator scale.
- (7) On aircraft 001-006,
at terminal board TB238 accessible through console assembly opening, left side wall, F.S. 182, connect multimeter between terminals C or D of module 20 and terminals C or D of module 21 (Ref. Fig. 501).

R

- (7) On aircraft 007-999,
disconnect wires 3251-4A22V and 3251-4B22V at splice 3299-SP2, and wires 3251-8A22V and 3251-8B22V at splice 3299-SP1. Splices are accessible through console assembly opening at FS 150, WL 190, and LBL 50. Connect multimeter across wires 3251-8B22V and 3251-4B22V. Set multimeter to read continuity.
- (8) Turn adjusting screw counterclockwise (outward) until screw adjustment travel is all the way out (Ref. Fig. 502).
- (9) From the centered (0-degree) position, turn steering wheel to approximately the 20-degree nose wheel position (approximately 45 degrees on the protractor). Hold steering wheel in this position.
- (10) On aircraft 001-031 without SB32-094,
turn adjusting screw clockwise (inward) until continuity indicated on multimeter shows switch has opened, then turn screw clockwise an additional one-third (1/3) turn.

R

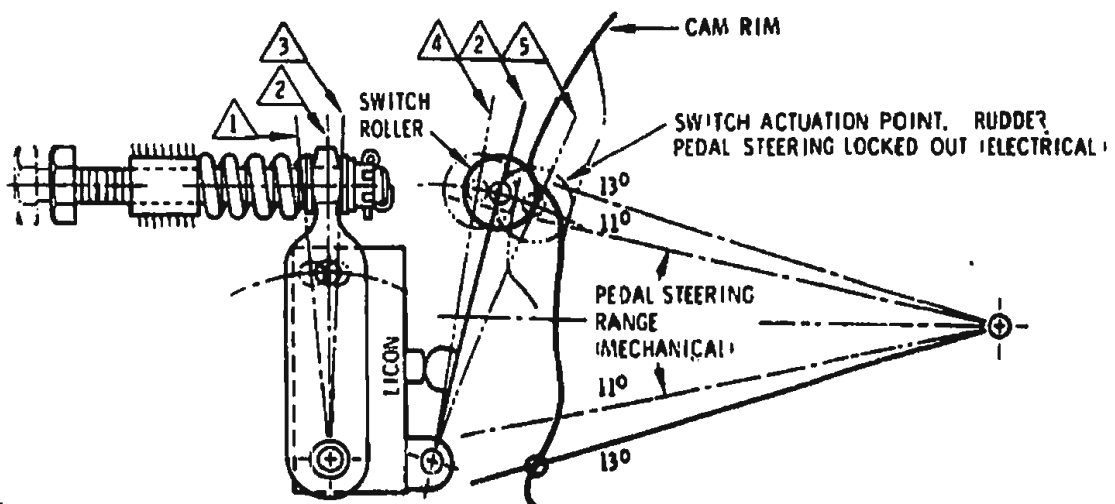
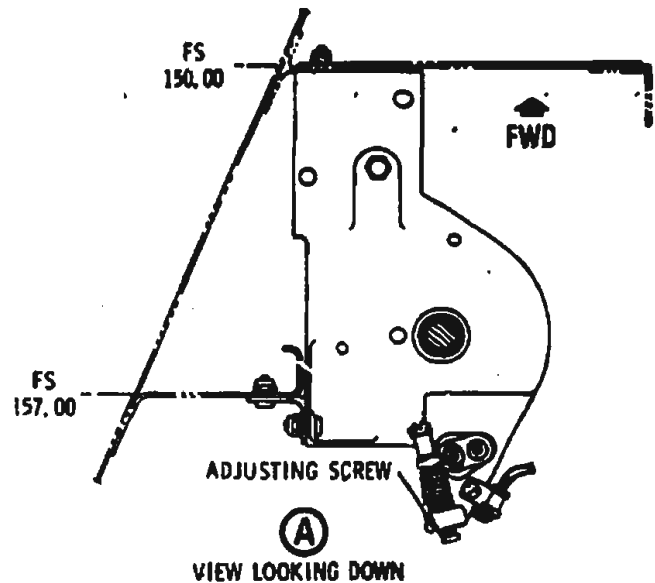
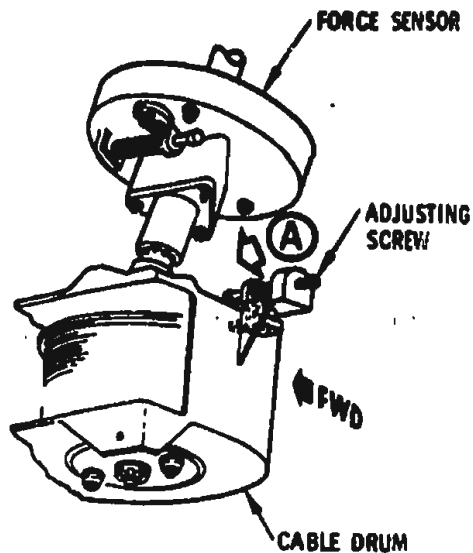
- (10) On aircraft 001-031 with SB32-094, and 032-999,
turn adjusting screw clockwise (inward) until continuity indicated on multimeter shows switch has opened, then turn adjusting screw clockwise (inward) an additional turn.
- (11) Return steering wheel to 0-degree position.
- (12) Rotate steering wheel fully in both directions. Switch must open at approximately 14 degrees (approximately 34 degrees on the protractor) and remain open for remaining steering wheel travel.

EFFECTIVITY: ALL

001B

32-51-15
Page 504
Jul 15/84

LOCKHEED
MAINTENANCE MANUAL



NOTE

- 1 ADJUSTING SCREW FULL OUT
- 2 SWITCH OPENS
- 3 ADJUSTING SCREW POSITION AFTER ADDITIONAL ADJUSTMENT INWARD FROM SWITCH OPEN POSITION

- 4 ROLLER POSITION WHEN ON CAM RIM
- 5 ROLLER POSITION AT 0-DEGREE STEERING POSITION
- 6 CAM SHOWN AT STEERING HANDWHEEL 13-DEGREE LEFT POSITION

M1-0002-32-561

Switch Adjustment Diagram
Figure 502

EFFECTIVITY: ALL

001B

32-51-15
Page 505
Mar 15/84



(13) On aircraft 001-006,
remove multimeter. Remove tag and close circuit
breaker opened in Step 3A(3).

R (13) On aircraft 007-999,
remove multimeter. Connect wires disconnected in Step
3A (7). Remove tag and close circuit breaker opened in
Step 3A (3).

(14) Alternately operate rudder pedals to normal rudder
pedal operating limits (servo stops). Rudder pedal
disconnect actuator must not disconnect at any position
of rudder pedal travel.

(15) If switch adjustment is required to meet the switch
performance requirements of Steps 3A(12) and 3A(14),
repeat Steps 3A(3), 3A(7), and 3A(10) through 3A(14),
except readjust switch as required but not to exceed
1/2 turn.

(16) Remove index pointer and protractor installed in Steps
3A(5) and 3A(6).

CAUTION: WIRES WHICH ARE NOT PROPERLY SUPPORTED AND ROUTED
ARE SUBJECT TO CHAFING AND STRAIN WHICH MAY LEAD
TO WIRE BREAKAGE.

(17) Verify that switch wires are properly clamped and
routed to prevent chafing and strain due to stretching.

(18) Install console removed in Step 3A(2).

(19) Turn off hydraulic system C pressure as required (Ref.
29-11-00).

(20) Connect NLG upper and lower torque arms as required.

EFFECTIVITY: ALL

001B

32-51-15

Page 506

Jul 15/84

**NOSE GEAR STEERING FORCE SENSOR SWITCH - ADJUSTMENT AND TEST****1. Equipment and Materials**

Lock-wire, Fed Spec QQ-W-390, Cond A, inconel, 0.020-inch diameter, or equivalent

Multimeter, Simpson 260, or equivalent

2. Referenced Procedure

32-51-13 Nose Gear Steering Force Sensor - Removal and Installation

3. Adjustment/Test**A. Adjustment**

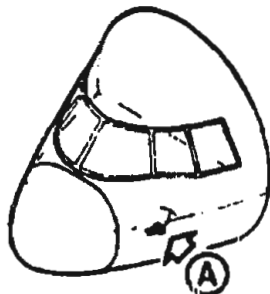
- (1) Remove nose gear steering force sensor (Ref. 32-51-13).
- (2) Remove cover from force sensor (Ref. Fig. 501).
- (3) Remove lock screw and remove lock.
- (4) Adjust bushing to provide a 0.016 to 0.020-inch gap at A.
- (5) Install lock and lock screw.
- (6) Restrain sensor bracket assembly but allow shaft assembly to rotate freely.
- (7) Set multimeter for continuity test and connect to sensor leads.
- (8) Rotate adjustment bolt until switch is open, with a gap at A of 0.005-inch minimum (either direction).
- (9) With zero gap at A (either direction) allow shaft assembly to slowly rotate toward neutral. Switch shall close when gap at A equals 0.012-inch maximum.
- (10) Disconnect multimeter.
- (11) Safety adjustment bolt with lock-wire.
- (12) Install cover on force sensor.

EFFECTIVITY: ALL

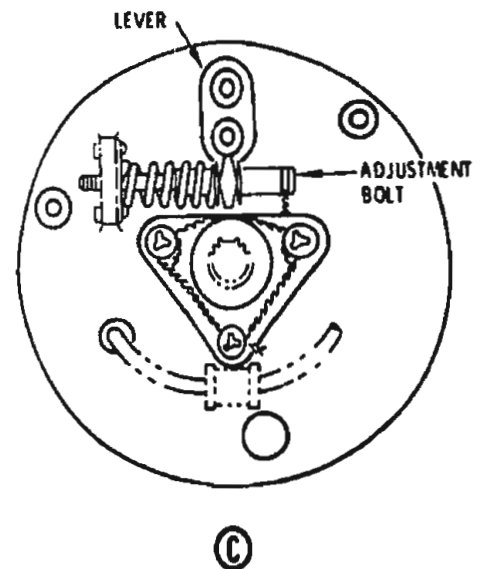
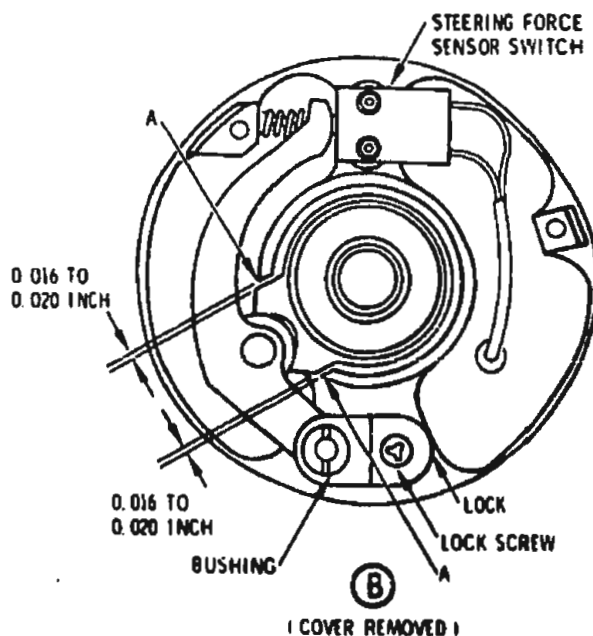
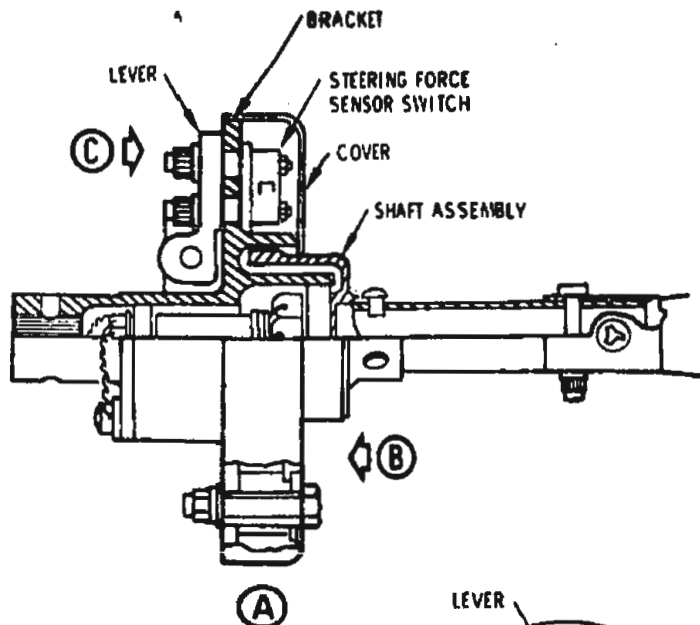
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32-51-16
Page 501
Mar 15/84

LOCKHEED
MAINTENANCE MANUAL



FLIGHT STATION
ZONE 211



MA 2080
MI-0100-32-317

Nose Gear Steering Force Sensor Switch - Adjustment and Test
Figure 501

EFFECTIVITY: ALL

001B

32-51-16
Page 502
Mar 15/84

LOCKHEED



MAINTENANCE MANUAL

- (13) Install nose gear steering force sensor in aircraft
(Ref. 32-51-13).

EFFECTIVITY: ALL

001B

32-51-16
Page 503/504
Mar 15/84



R RUDDER PEDAL STEERING INTERCONNECT MECHANISM CABLE DRUM
REMOVAL AND INSTALLATION

1. Equipment and Materials

Piano hinge wire, 1/16-inch diameter, 14-inches long, or equivalent

Cotter pin, MS24665-151, or equivalent

Bungee, 1/4-inch diameter, 6 feet long, or equivalent

2. Referenced Procedures

32-51-00 Nose Gear Steering System - Adjustment and Test

32-51-03 Nose Gear Steering Rudder Pedal Disconnect Actuator
- Removal and Installation

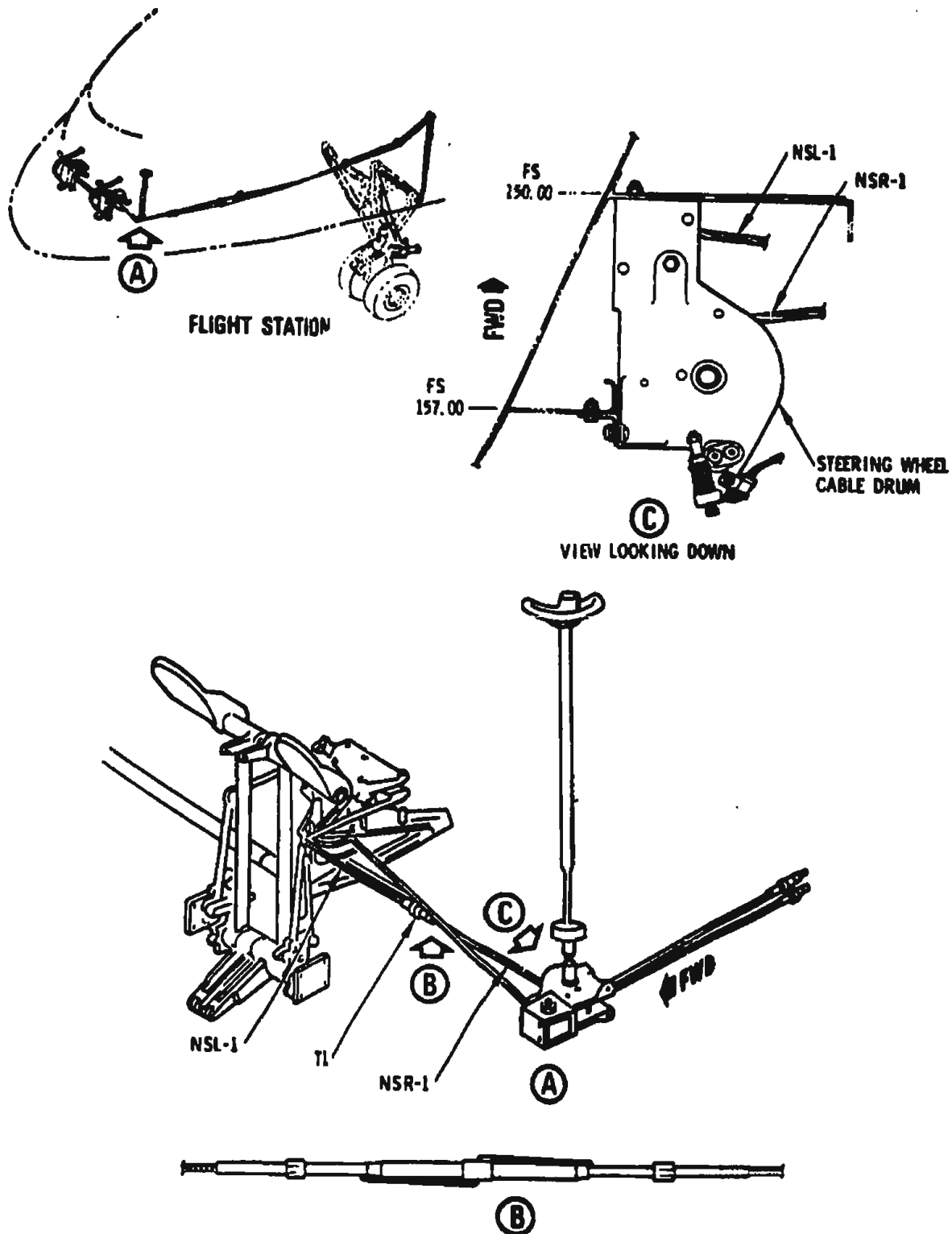
2. Removal/Installation

A. Removal

- (1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag circuit breaker GEAR NOSE STEERING (F19).
- (2) Remove rudder pedal disconnect actuator (Ref. 32-51-03).
- (3) In forward electronics service center (FESC), attach bungees to both cables (NSL-1 and NSR-1) leading inboard from steering wheel cable drum to rudder pedal steering mechanism cable drum (Ref. Fig. 401). Bungees should be attached as close to steering wheel cable drum as possible.
- (4) Lead bungees inboard and attach to steering mechanism frame. Bungees must keep tension on cables when turnbuckle T1 is disconnected.
- (5) At turnbuckle T1, disconnect cable NSL-1 from NSR-1; keep barrel with cable NSR-1. Mark NSL-1 for location on steering mechanism cable drum.
- (6) Remove bolts (7), washers (6), and nuts (5) securing axle (12) to frame (3) (Ref. Fig. 402).

EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-545

Rigging Components Location
Figure 401

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001B EFFECTIVITY: ALL

32-51-18
Page 402
Mar 15/84

LOCKHEED
MAINTENANCE MANUAL

- (7) Remove bolts (4), washers (2), and nuts (1) securing support bracket (9) to frame (3).
- (8) Remove components assembly consisting of support bracket (9), follower assembly (8), cable drum (11) with NSL-1 cable, axle (12), and locking collar (10).
- (9) Remove locking collar (10) from components assembly.
- (10) Lift axle upward out of cable drum, follower assembly, and support bracket.
- (11) Remove cable drum and remove cable from drum.

B. Installation

- (1) With cable drum oriented such that cable stop retainer is facing outboard (left), install cable on drum starting with cable lead in aft side of top cable groove. Wrap cable in groove counterclockwise around drum positioning cable stop in stop retainer. Continue to wrap cable around drum and exit drum from lower groove at forward side of drum (Ref. Fig. 402).

CAUTION: INSTALL FOLLOWER (8) WITH TAGS UP FACING CABLE DRUM. SEE FIGURE 402, DELTA 1.

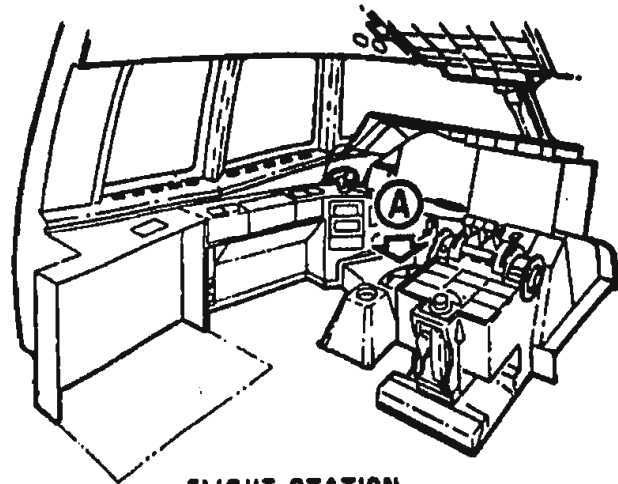
- (2) Position support bracket (9), follower assembly (8), and cable drum (11) in a stack and insert axle (12).
- (3) Secure components with locking collar (10). Tighten to torque of 50-75 lb in.
- (4) Position components assembly on frame (3) and secure with bolts (4) and (7), washers (2) and (6), and nuts (1) and (5).
- (5) At turnbuckle T1, connect short end of cable NSL-1 to NSR-1 (Ref. Fig. 401). Remove bungees.
- (6) Install rudder pedal disconnect actuator (Ref. 32-51-03).
- (7) Remove tag and close circuit breaker opened in Step A(1).
- (8) Rig cables in accordance with 32-51-00, adjustment and test.
- (9) Verify that turnbuckle T1 is safetied with clip.

R EFFECTIVITY: ALL
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001B

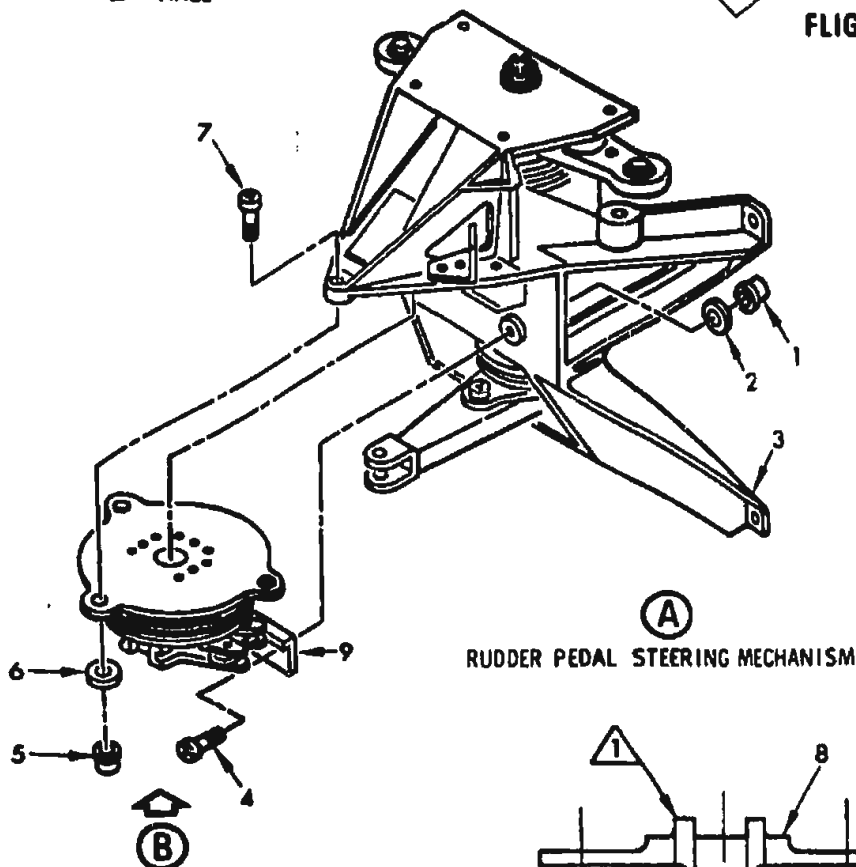
32-51-18
Page 403
Mar 15/84

LOCKHEED
MAINTENANCE MANUAL

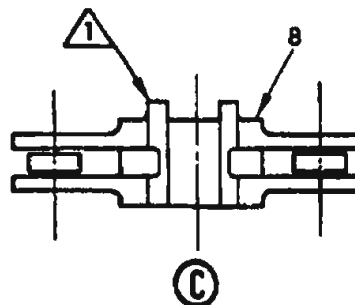
- 1 NUT (2)
- 2 WASHER (2)
- 3 FRAME
- 4 BOLT (2)
- 5 NUT (3)
- 6 WASHER (3)
- 7 BOLT (3)
- ① 8 FOLLOWER ASSEMBLY
- 9 SUPPORT BRACKET
- 10 LOCKING COLLAR
- 11 CABLE DRUM
- 12 AXLE



FLIGHT STATION
LEFT SIDE

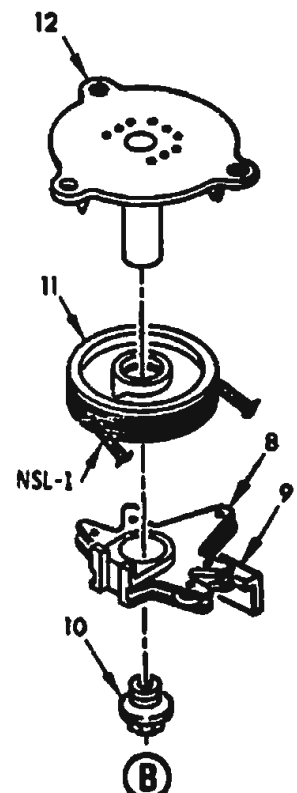


①
RUDDER PEDAL STEERING MECHANISM



NOTE

- ① INSTALL FOLLOWER ASSEMBLY
WITH TANGS UP AS IN ③



COMPONENTS ASSEMBLY

M1-0102-32-544

Rudder Pedal Steering Interconnect Mechanism Cable Drum
Removal and Installation
Figure 402

R EFFECTIVITY: ALL

R
001B

32-51-18
Page 404
Mar 15/84

LOCKHEED
MAINTENANCE MANUAL

LANDING GEAR POSITION INDICATING AND WARNING SYSTEMS
DESCRIPTION AND OPERATION

1. General

The position indicating and warning system provides the flight crew with visual and aural indication of the status of each landing gear, its respective door system, and the tail skid. The system includes 14 sensors and their respective targets, 10 indicating and warning lights, parts of the proximity switch card module, the logic box, indicator lights control box, and the aural warning system. Three mechanical indicators, one for the nose landing gear (NLG) and two for the main landing gear (MLG), are also included.

Six of the indicator and warning lights are installed in the pilots center instrument panel, zone 210, and four indicator lights are installed in the Flight Engineer/Second Officers annunciator panel, zone 215 (Ref. Fig. 1). One aural warning horn is an integral part of the aural warning unit located under the Flight Engineer/Second Officers desk. Another horn is located above the console. Proximity sensors are located to sense the landing gear, landing gear door, and tail skid positions (Ref. Fig. 2). The NLG downlock sensor is installed on the upper jury brace member, zone 711. The NLG uplock sensor is installed on the right side of the NLG uplock assembly link, zone 711. The right and left nose door up-position sensors are mounted on the inboard edge of the nosewheel well, zone 114. The right and left MLG downlock sensors are mounted on each landing gear jury brace. The right and left MLG up-position sensors are mounted on the inboard side of the upper side brace of each landing gear, zones 731 and 741. The left and right MLG door uplock sensors are mounted on each door actuator in the wheel wells, zones 148 and 149. The left and right truck unlevel sensors are mounted on each truck, zones 731 and 741. The tail skid sensors are mounted in the tail skid assembly, zone 439. The NLG mechanical indicator is located on the NLG jury brace, zone 711, and the MLG mechanical indicators are located on the wing upper skin, zones 541 and 641. A switch on the landing gear lever provides "gear down" or "gear not down" information to the Ground Proximity Warning System.

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2. Operation

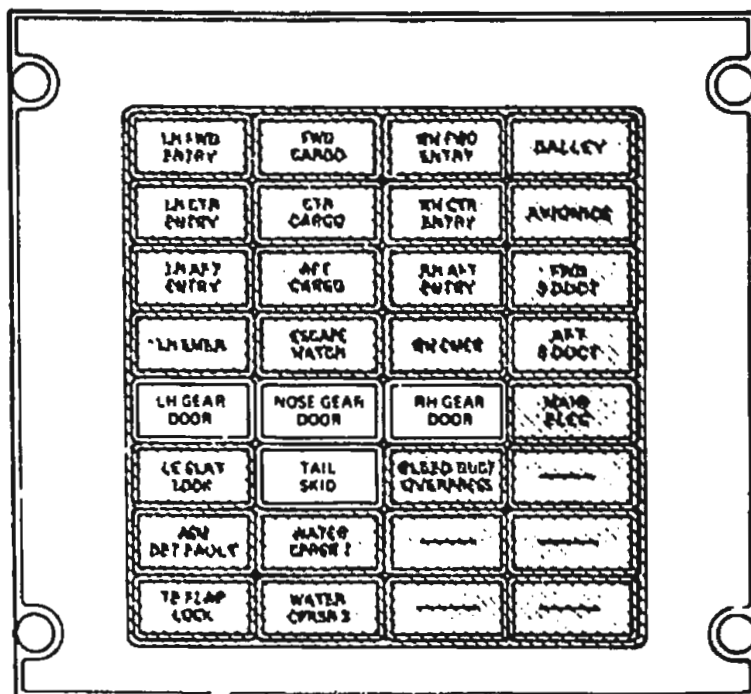
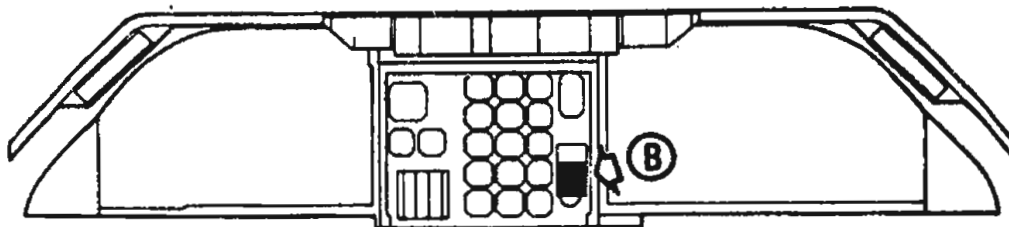
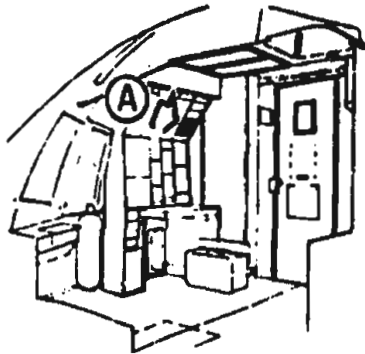
The warning and indicator signals from the 16 sensors (Ref. Fig. 3, 4, and 5) affect logic circuits in either the proximity switch card module, the logic box, or both (31-22-00). All indicator or warning light power is eventually routed through the indicator lights control box for illumination level control

EFFECTIVITY: ALL

32-61-00

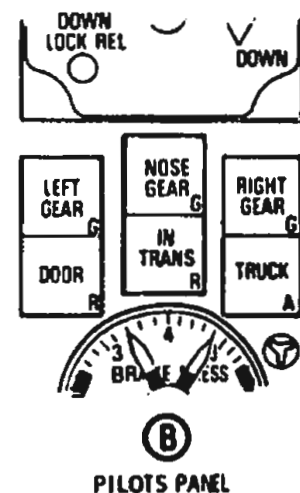
Page 1
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



(A)

FLIGHT ENGINEER/SECOND OFFICERS PANEL



M1-0002-32-170

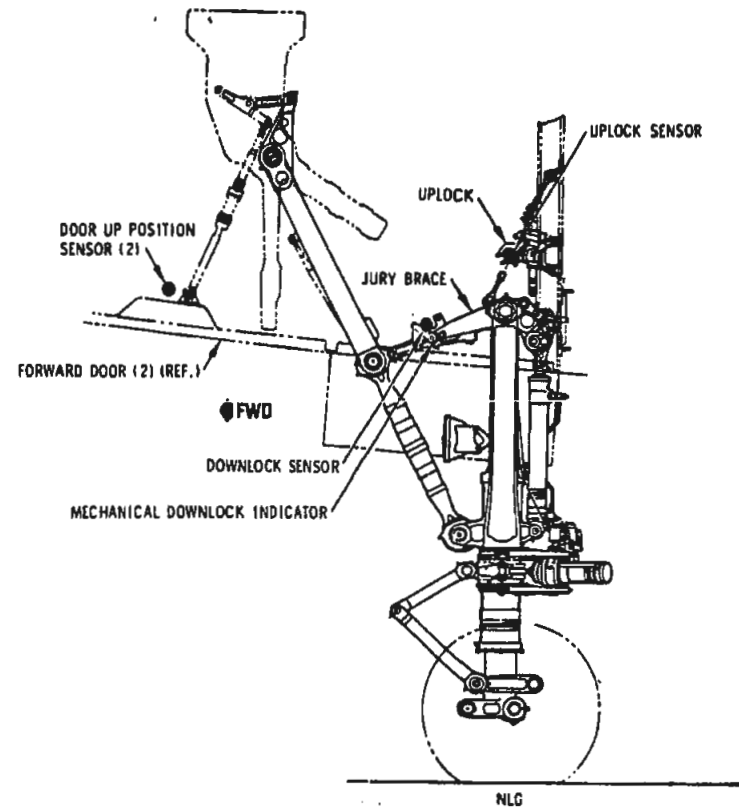
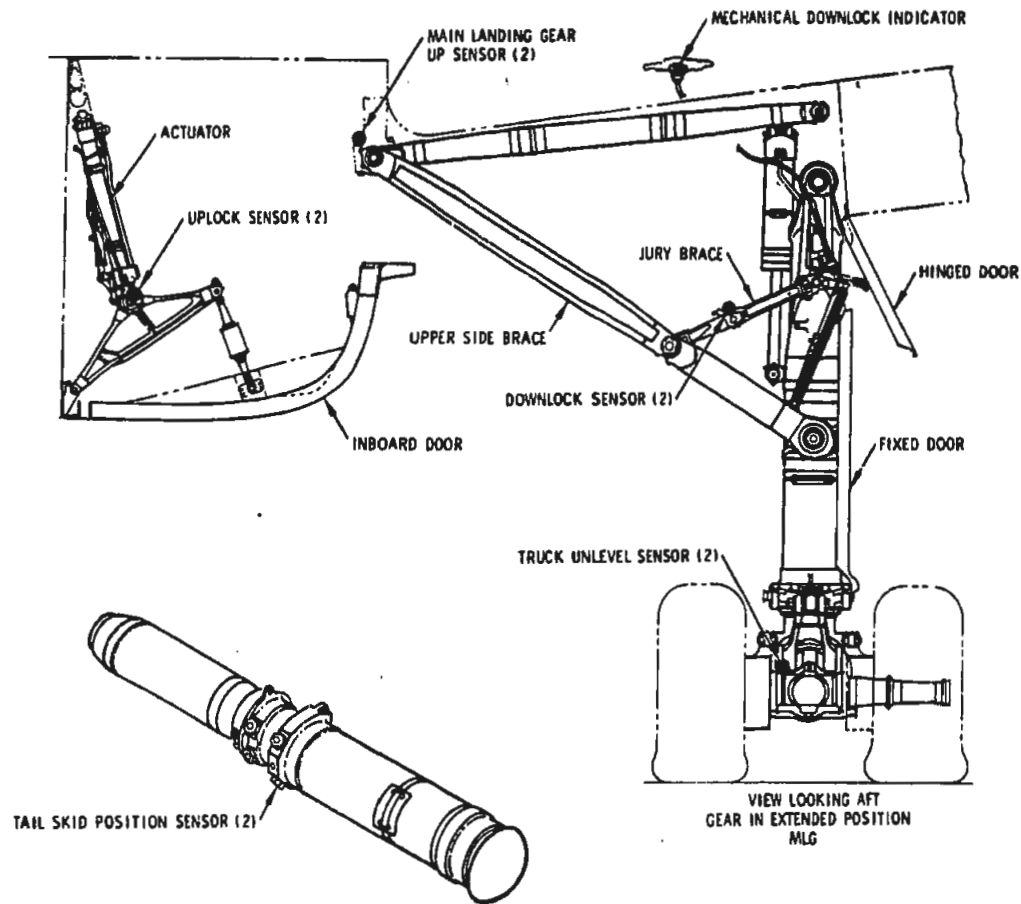
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Position Indicating and Warning Systems Indicator Lights
Figure 1

EFFECTIVITY: ALL

0018

32-61-00
Page 2
May 15/82



M1-0001-32-173

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Sensor and Mechanical Indicator Locations
Figure 2

EFFECTIVITY: ALL

32-61-00
Page 3/4
Aug 15/81

001B



(Ref. 33-17-00). The sensors are energized from the three 28V dc buses to supply the landing gear status intelligence to the flight crew. The truck unlevel logic actuates the locking solenoid in the landing gear control switch circuit (Ref. 32-31-00) and causes the Captains TRUCK indicator light to come on when either truck is in an unsafe condition for retraction into the MLG wheel wells. The solenoid releases the control switch lock only when the trucks return to the safe retract configuration, or when the manual override is operated.

The LEFT GEAR, NOSE GEAR, and RIGHT GEAR indicator lights on the pilots center instrument panel, zone 210, come on when each gear is down and locked to complete the ground return for the three indicators. The IN TRANS indicator light on the pilots center instrument panel comes on whenever the landing gears are not down and locked, or the landing gear control lever position is not in agreement with the position of a landing gear or landing gear door.

R The applicable Flight Engineer/Second Officers annunciator panel LH GEAR DOOR, NOSE GEAR DOOR, or RH GEAR DOOR indicator light comes on, along with the pilots center instrument panel IN TRANS and DOOR indicator lights, if one or more of the landing gear doors is not in agreement with the position of the LANDING GEAR control lever. If a landing gear is not in agreement, the IN TRANSIT light on the pilots center instrument panel comes on; also, on aircraft 031-033, the applicable gear door light on the Flight Engineer/Second Officers annunciator panel comes on to indicate the discrepant gear.

The TAIL SKID indicator light on the Flight Engineer/Second Officers annunciator panel comes on whenever the tail skid is in transit (Ref. 32-71-00). In the landing gear retract condition, the Flight Engineer/Second Officers indicator lights come on to pinpoint which door is not closed and latched.

The aural warning system is activated when one or more of the landing gears are not down-and-locked, airspeed is less than 180 knots, the flap control lever is past 30 degrees, and one or more throttle levers are retarded beyond the minimum flight position. The horn can be cut off momentarily by depressing the HORN CUT OFF switch. The system automatically resets to accept a new warning signal. If the flap position is in the landing range, the warning horn cannot be cut off.

3. MLG Mechanical Downlock Indicator

A. Description and Operation

The MLG mechanical downlock indicator assembly is mounted on the MLG trunnion arm and the jury brace universal shaft.

EFFECTIVITY: ALL

001B

32-61-00

Page 5
Aug 15/82



The assembly consists of the bracket, a plunger assembly, a flex tube assembly, and a visual pop-up indicator mounted in the wing upper skin (Ref. Fig. 6).

The indicator shows, by pop-up action, that the MLG is down and locked. As the gear approaches the down position, the jury brace actuator upper rod end contacts the plunger. The plunger is positioned upward. The plunger action is transmitted through the flex tube to the visual pop-up indicator, which causes the indicator to rise one-half inch above the wing upper skin. A spring in the plunger assembly compresses if the pop-up indicator is frozen or otherwise immobilized, thereby preventing interference to the MLG downlock operation.

4. NLG Downlock Visual Inspection Tube

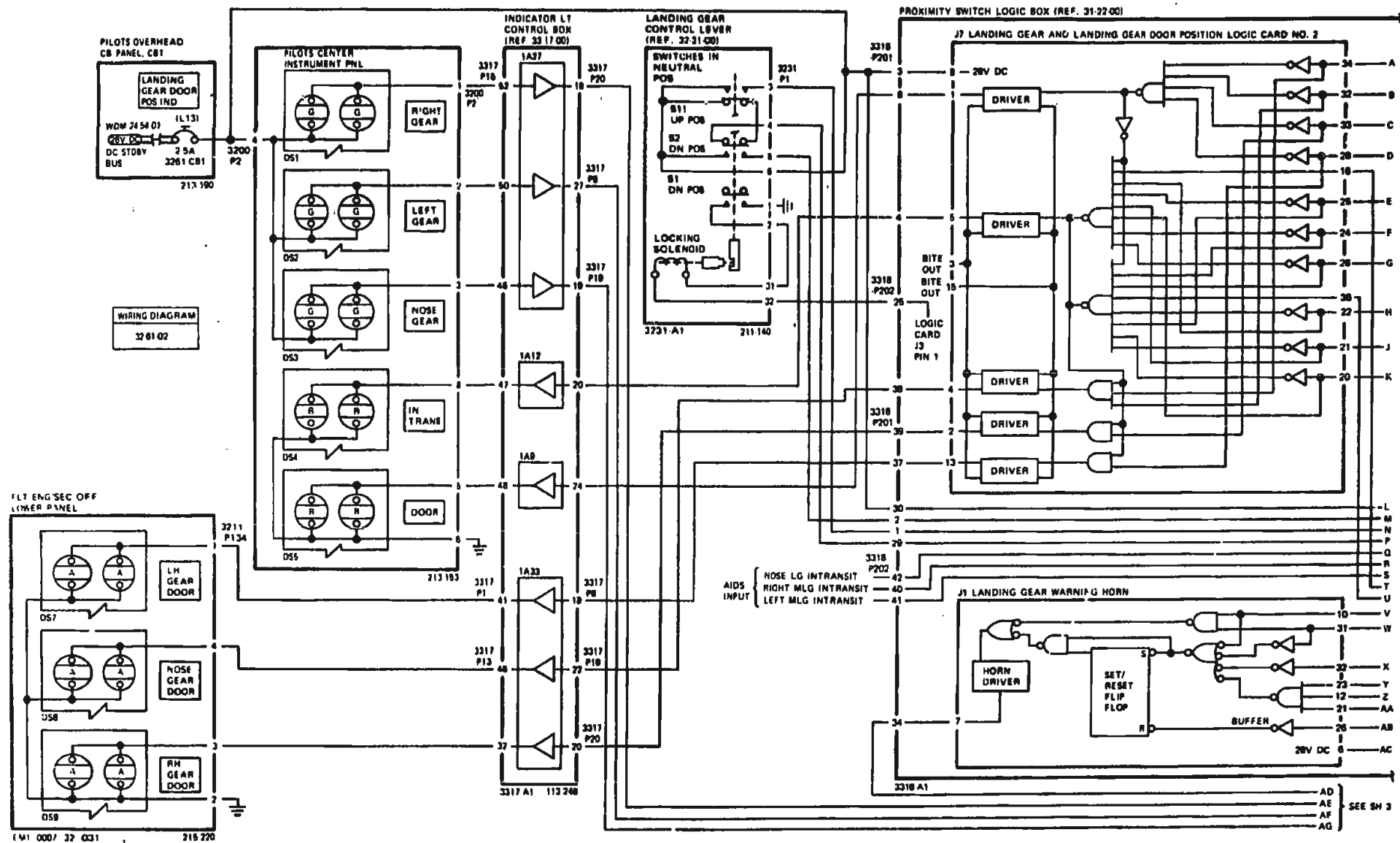
A. Description and Operation

The NLG downlock visual inspection tube is mounted on the canted bulkhead at FS 328.00 (Ref. Fig. 7). The tube is a nonmagnifying device containing windows and seals to prevent bypass of air, and a mechanically actuated tube end cover.

The tube is usable when the end cover is removed by pulling out on the actuating knob. The NLG mechanical downlock is visible through the tube.

R EFFECTIVITY: ALL
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001B

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MAINTENANCE MANUAL



R Landing Gear and Door Position Indicating and Warning System
R Electrical Schematic
R Figure 3 (Sheet 1)

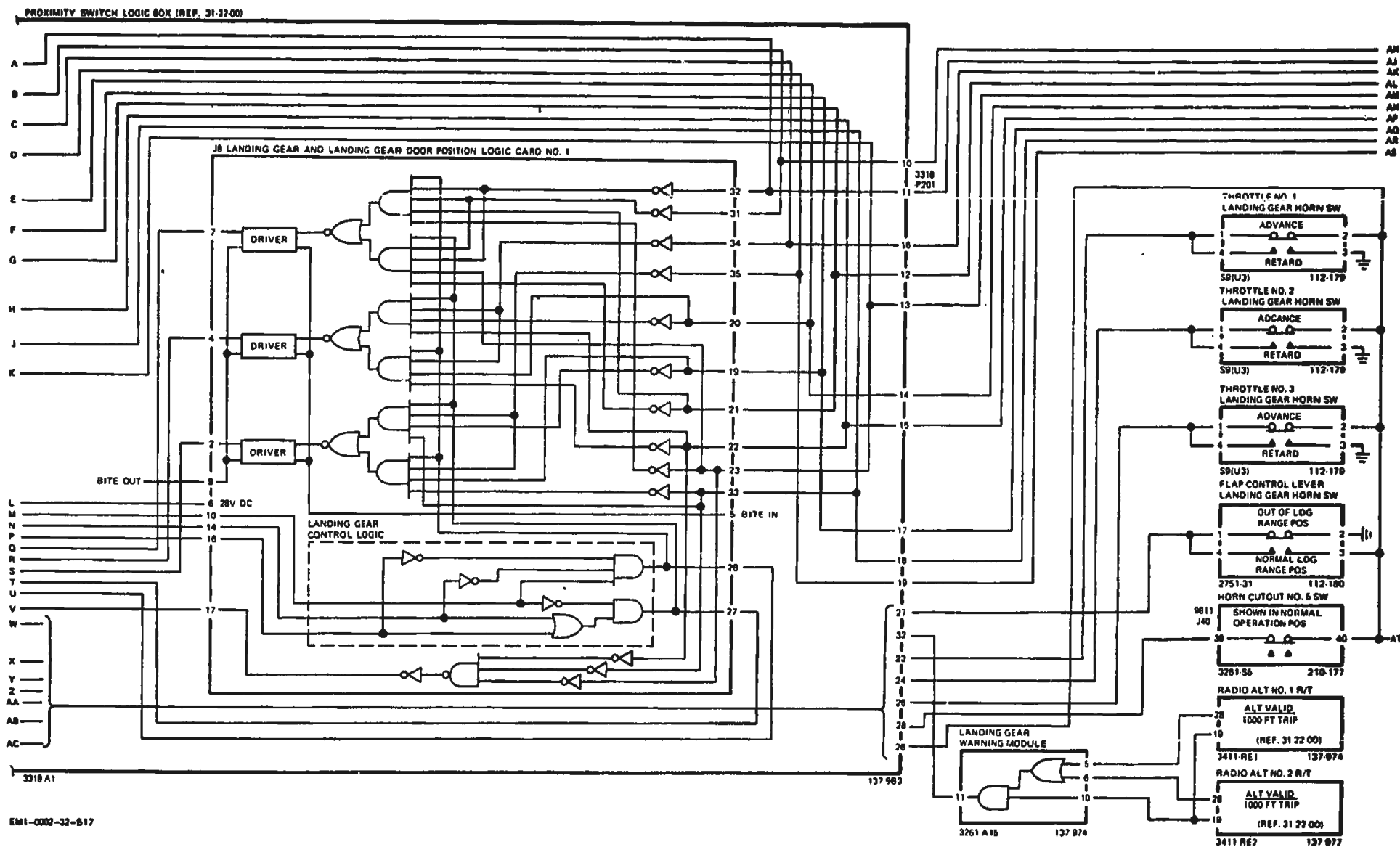
EFFECTIVITY: 001-030

32-61-00
Page 7/8
Aug 15/82



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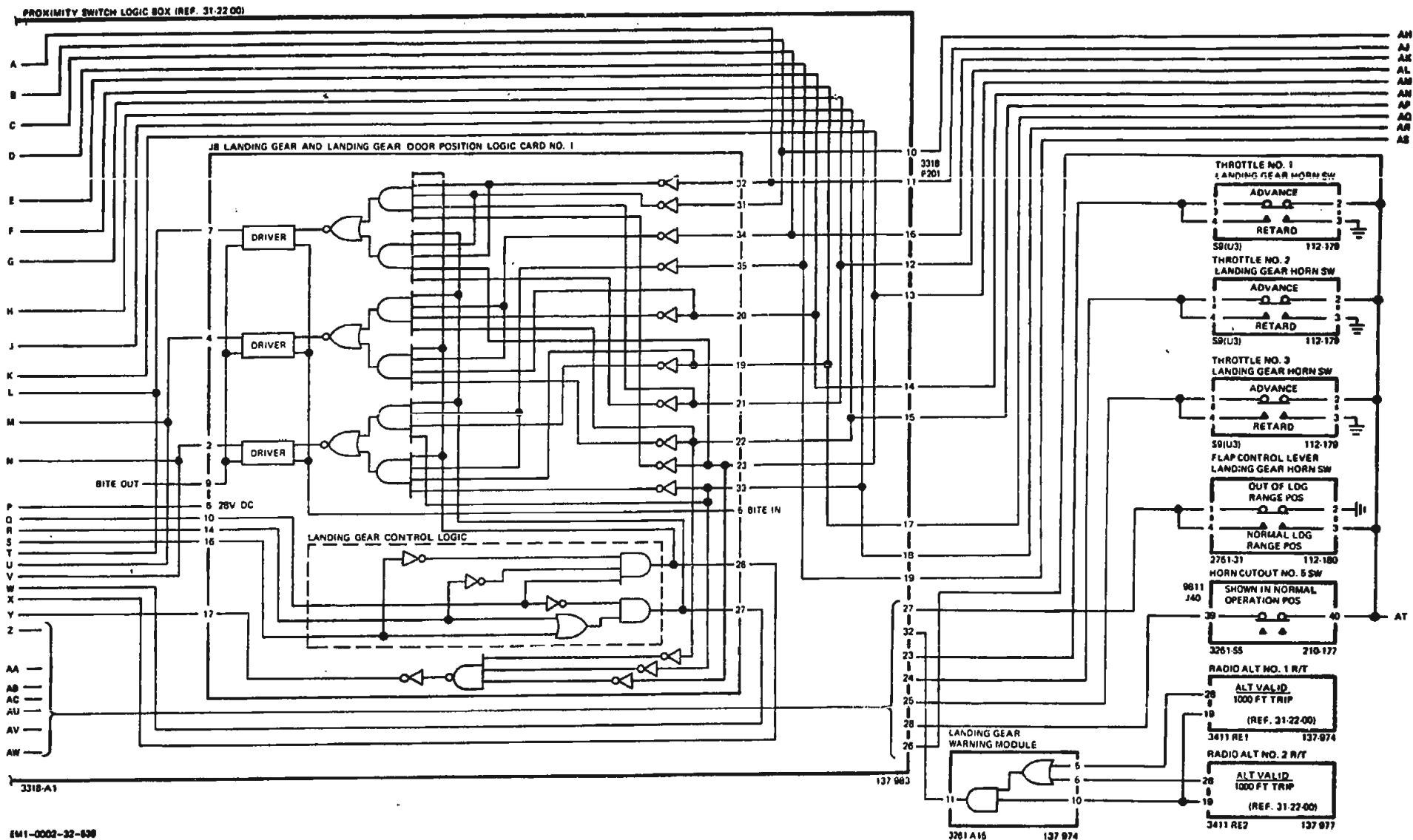
Page 9/10
Aug 15/82



Landing Gear and Door Position Indicating and Warning System
Electrical Schematic
Figure 3 (Sheet 2)

EFFECTIVITY: 001-030

32-61-00
Page 11/12
May 15/88

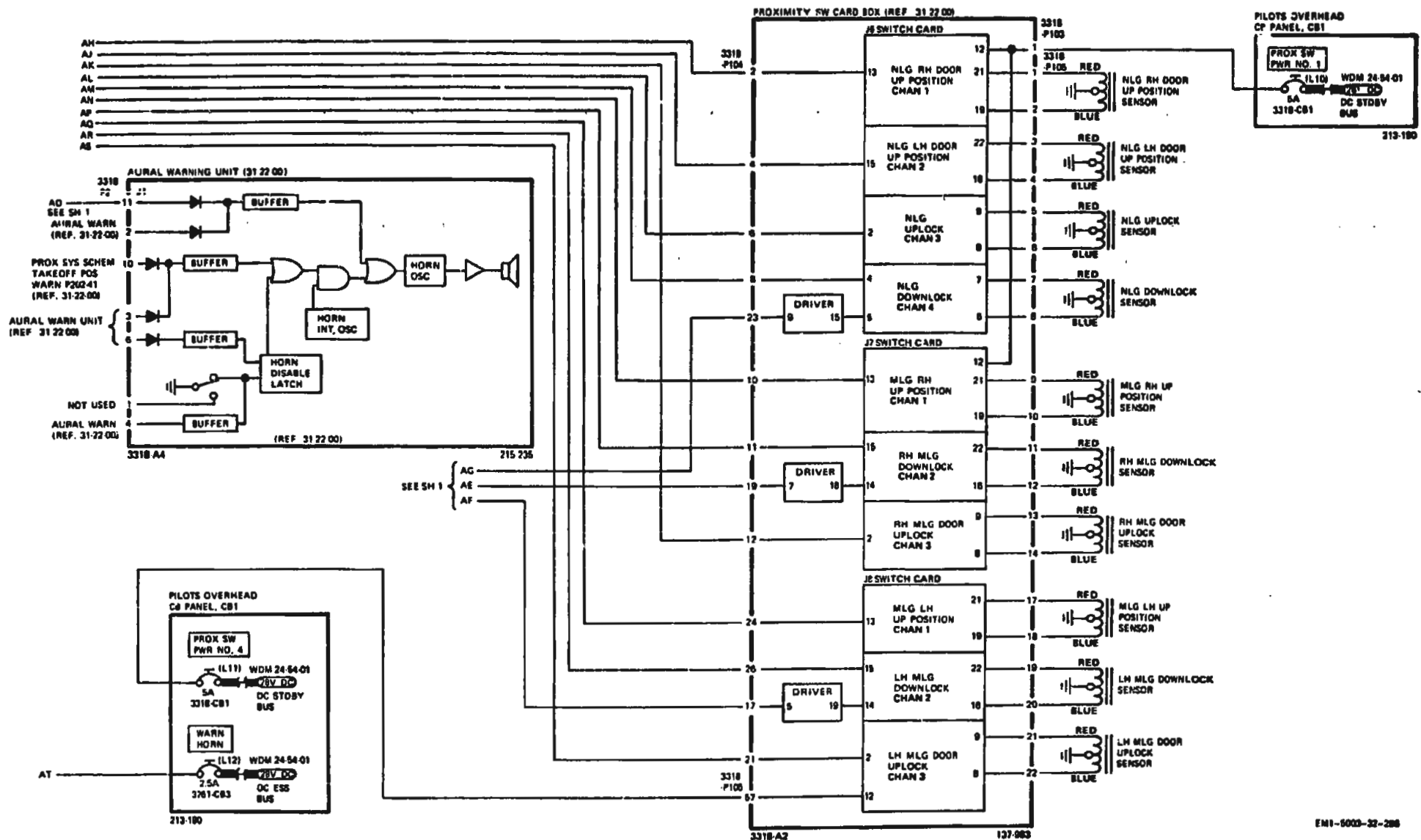


Landing Gear and Door Position Indicating and Warning System
Electrical Schematic
Figure 3 (Sheet 2)

EFFECTIVITY: 031-033

32-61-00
Page 13/14
May 15/88

LOCKHEED
MAINTENANCE MANUAL

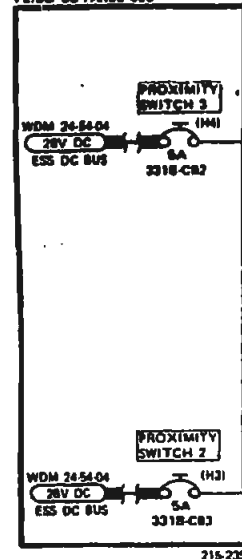


Landing Gear and Door Position Indicating and Warning System
Electrical Schematic
Figure 3 (Sheet 3)

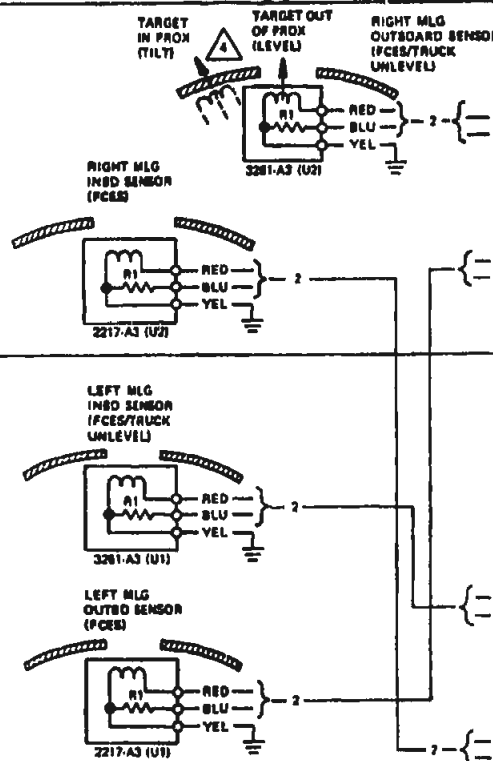
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Page 15/16
Aug 15/75

EFFECTIVITY: ALL
050B

PERD CB PANEL C83



215-235



NOTE

1 - 4 - NO. IN WIRE PROVIDES CODE FOR WIRING DIA CROSS REFERENCE

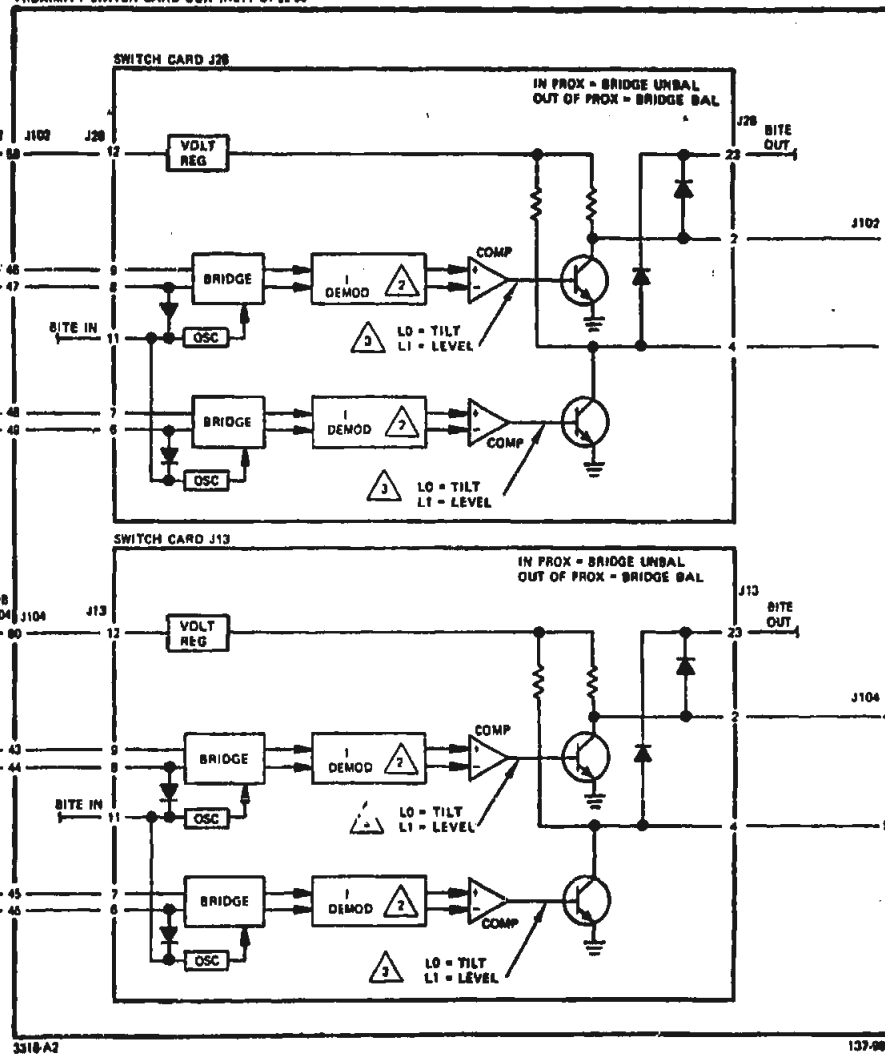
1 - INVERSION OF OUTPUT

2 - L0 = LOGIC 0 (ZERO)
L1 = LOGIC 1 (ONE)

3 - APPLIES TO ALL MLG TRUCK POSITION SENSOR/TARGET INSTALLATIONS

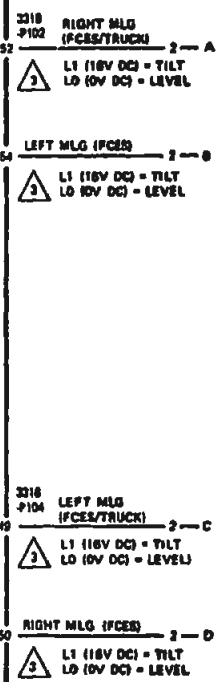
CODE	WIRING DIA	SH
1	31-22-08	1
2	32-61-03	1

PROXIMITY SWITCH CARD BOX (REF. 31-22-08)



3318-A2

137-983



EM1-0001-32-710

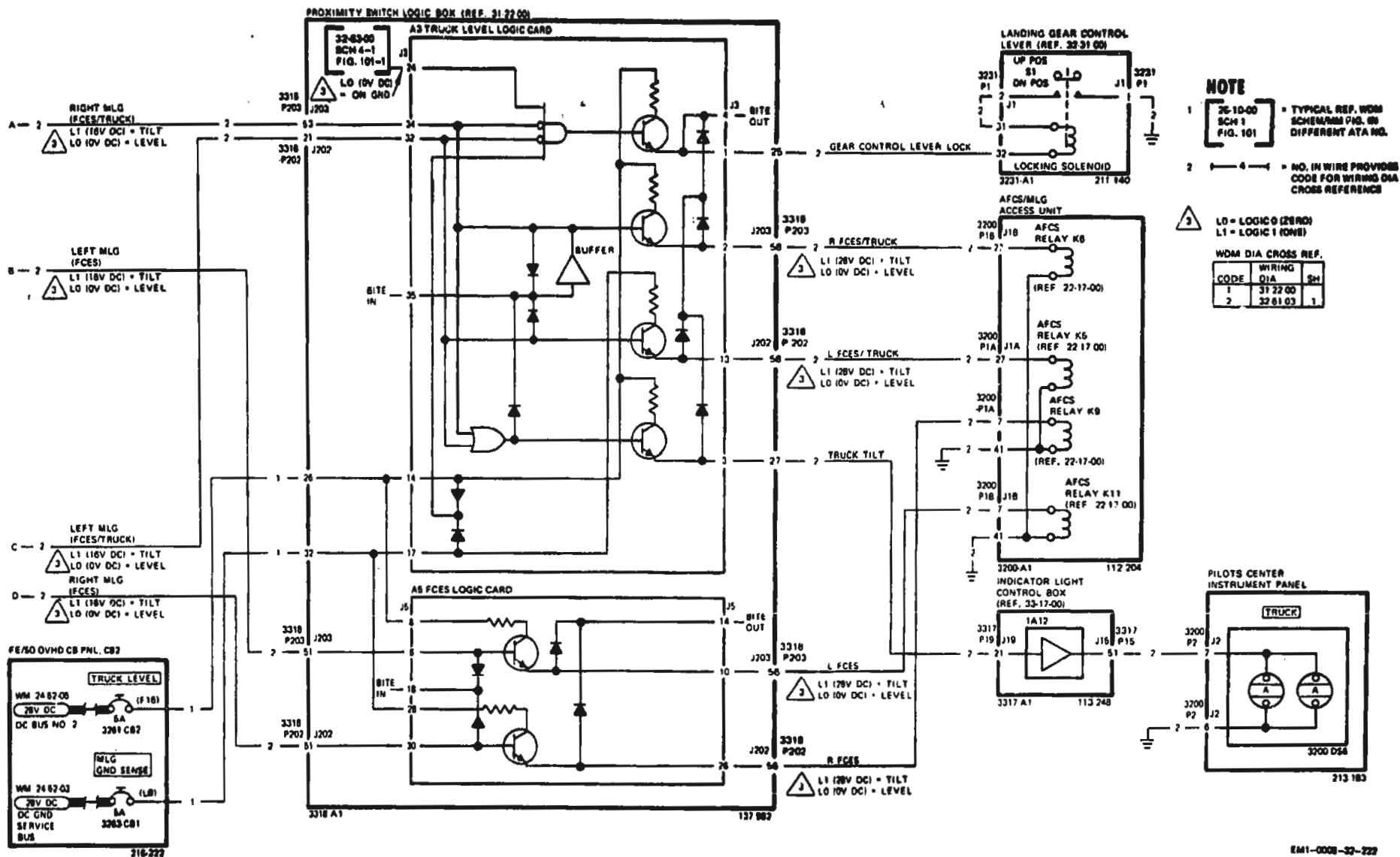
R
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Truck Position Indicating System Electrical Schematic
Figure 4 (Sheet 1)

EFFECTIVITY: ALL

001B

32-61-00
Page 17/18
Jun 15/95

LOCKHEED
MAINTENANCE MANUAL



Truck Position Indicating System Electrical Schematic
Figure 4 (Sheet 2)

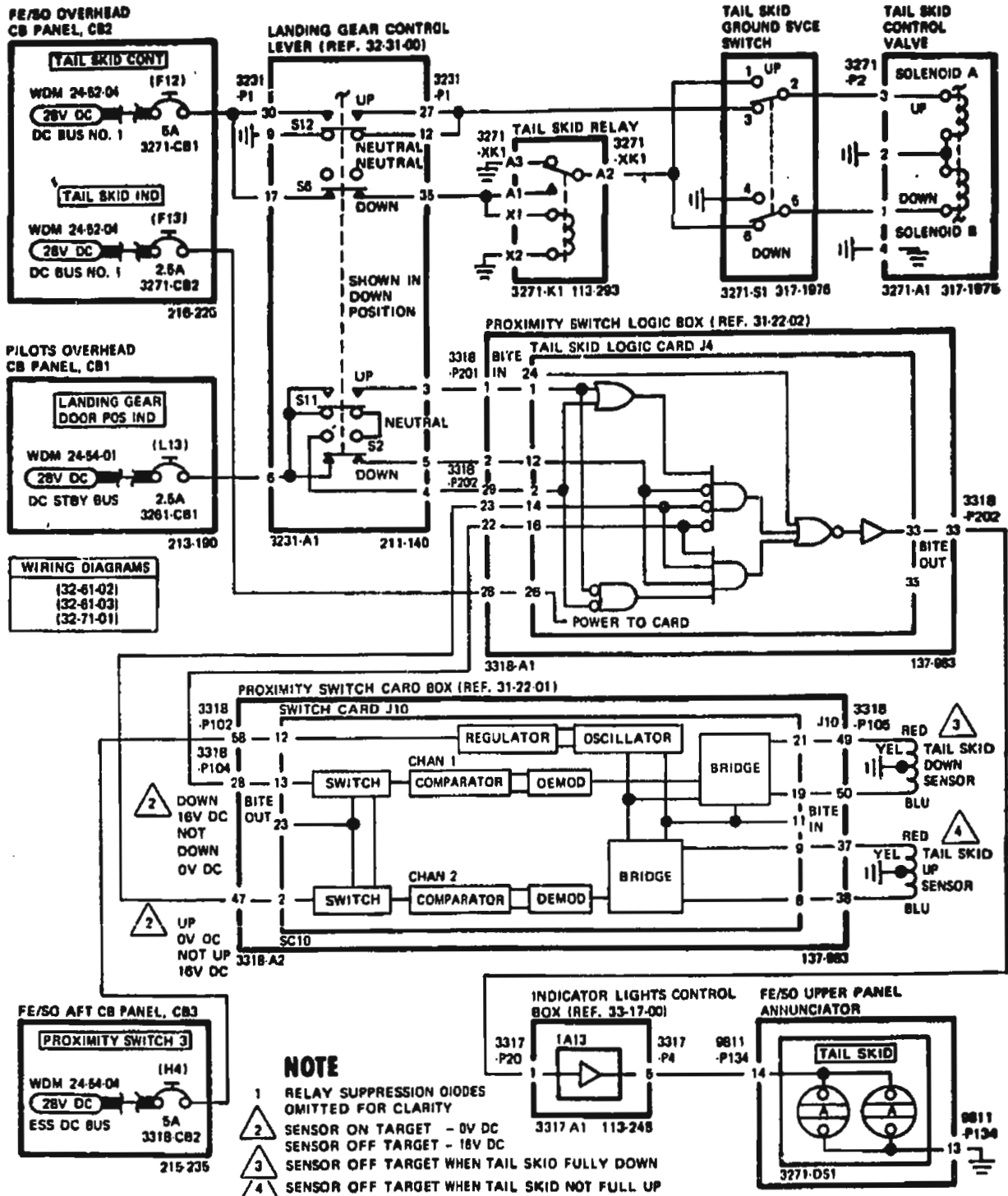
32-61-00
Page 19/20
Nov 15/86

EFFECTIVITY: ALL

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EM1-0008-32-222

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MAINTENANCE MANUAL



EM1-0011-32-129

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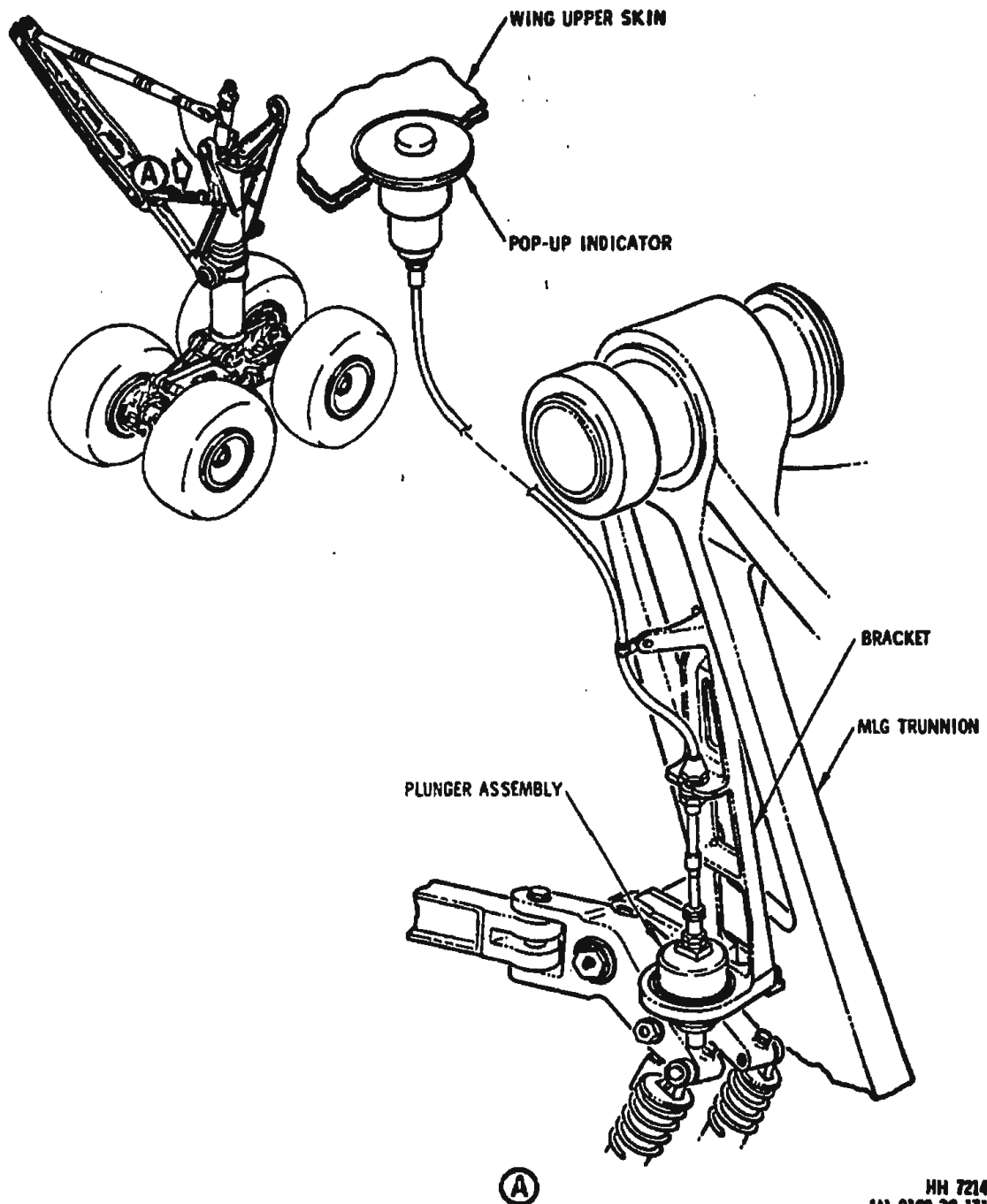
**Tail Skid Position Indicating System Electrical Schematic
Figure 5**

EFFECTIVITY: ALL

32-61-00
Page 21
Dec 15/93

001B

LOCKHEED
MAINTENANCE MANUAL



HH 7214
M1-0100-32-171

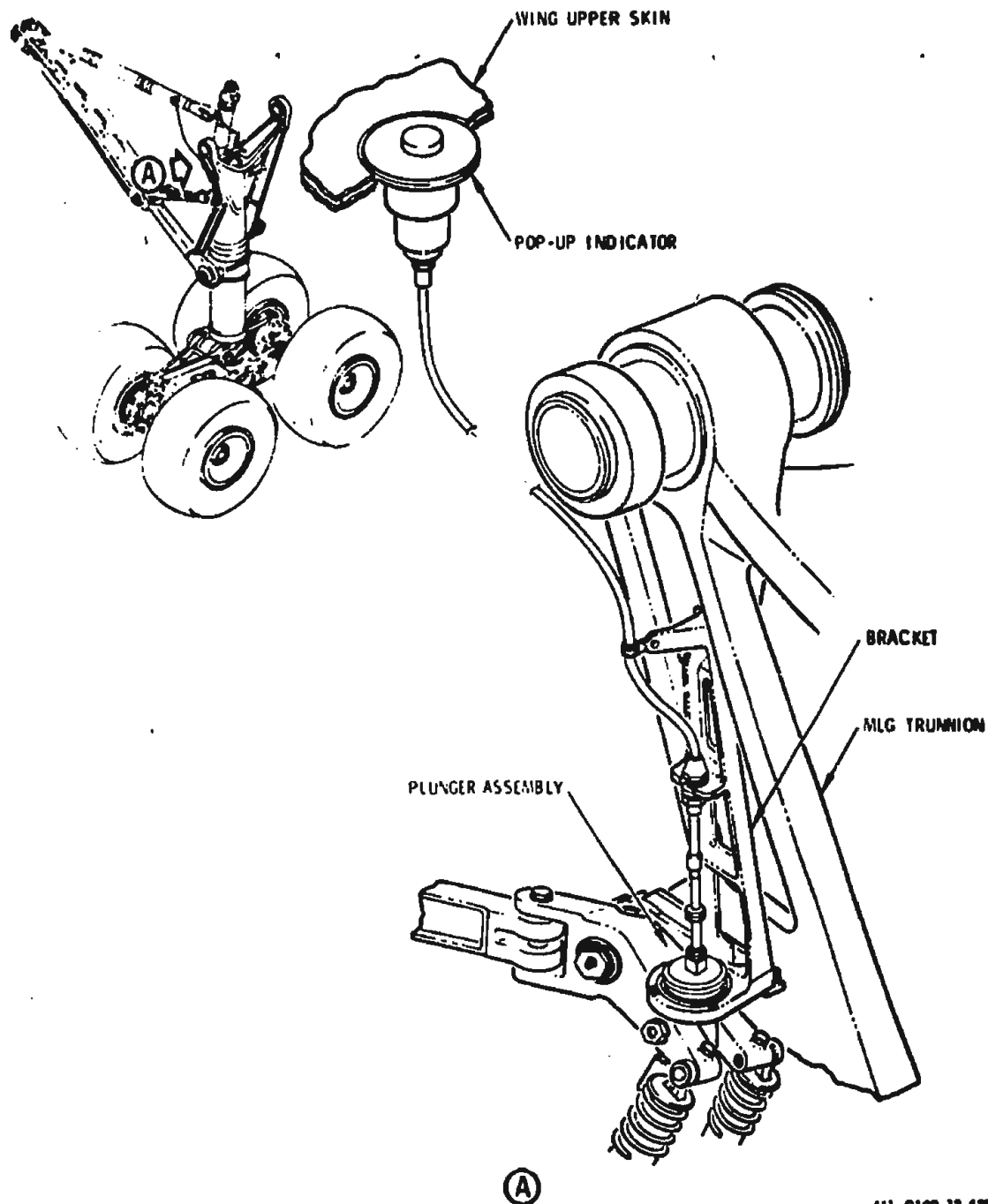
Main Landing Gear Mechanical Downlock Indicator
Figure 6

R
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EFFECTIVITY: 001-023 WITHOUT SB32-064

32-61-00
Page 22
Aug 15/77

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-479

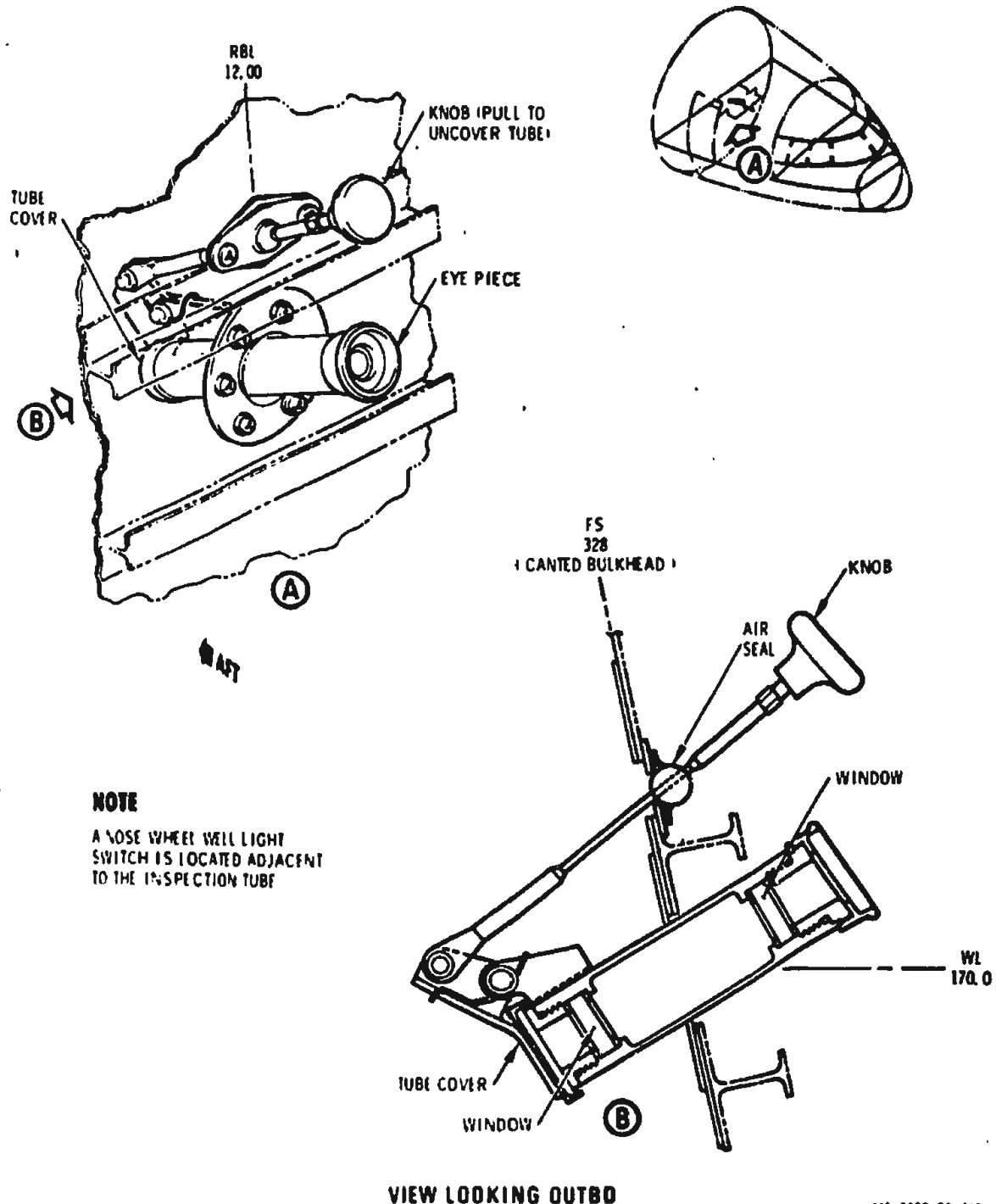
Main Landing Gear Mechanical Downlock Indicator
Figure 6

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EFFECTIVITY: 001-023 WITH SB32-064 AND 024-033

32-61-00
Page 23
Aug 15/82

LOCKHEED
MAINTENANCE MANUAL



111-5500-32-461

R
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Nose Landing Gear Downlock Visual Inspection Tube
Figure 7

EFFECTIVITY: ALL

32-61-00
Page 24
Aug 15/82

0018

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MAINTENANCE MANUAL

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LANDING GEAR POSITION INDICATING AND WARNING SYSTEM
FAULT ISOLATION

1. General

Reference data and fault isolation procedures for troubleshooting landing gear system faults are included in this section of the manual. A landing gear system malfunction detected by the flight crew is normally entered in the aircraft flight log book and reported to maintenance personnel by a FIRM fault code number. This number and the flight log book write-up can be found in the Chapter 32 Fault Code Index. The index specifies the maintenance manual section, fault isolation diagram figure number and, where appropriate, a block number indicating the diagram entry point containing the fault isolation procedure. When no block number is specified, the diagram entry point is Block 1.

Prerequisites listed at the top of each diagram identify mandatory preliminary steps and circuit breakers that must be closed before initiating any fault isolation step.

Schematic diagrams, identified by a SCHEM number, supplement fault isolation procedures as maintenance aids. The schematics show the basic system circuitry necessary for troubleshooting and include cross-reference indexes to the wiring diagram manual pages required for checking component interconnect wiring.

2. Fault Isolation

Table 101 is a list of fault isolation data in this section of the manual.

Landing Gear Position and Warning System Fault Isolation
Table 101

FIGURE	TITLE
101	Component Location Index
102	Components Locator Diagram
103	Truck Light On Intermittently
104	IN TRANS Light On With Gear Extended
105	LEFT GEAR, NOSE GEAR, RIGHT GEAR Light Not On With Gear Extended

EFFECTIVITY: ALL

001B

32-61-00
Page 101
Nov 15/82

Landing Gear Position and Warning System Fault Isolation (Cont)
Table 101

FIGURE	TITLE
106	LH GEAR DOOR, NOSE GEAR DOOR, RH GEAR DOOR Light On With Gear Up or Down
107	TAIL SKID Light Does Not Come On During Tail Skid Retraction or Extension
108	IN TRANS Light Does Not Come On
109	LEFT GEAR, NOSE GEAR, RIGHT GEAR Light On With Gear Up
110	IN TRANS Light On With Gear Retracted
R 111	TRUCK Legend On, Truck Level
112	TAIL SKID Light Does Not Go Off After Tail Skid Extension
113	TAIL SKID Light Does Not Go Off After Tail Skid Retraction
114	TAIL SKID Light Goes On After Tail Skid Retraction With LANDING GEAR Control Lever In NEUTRAL
115	RH GEAR OR DOOR, LH GEAR OR DOOR, or NOSE GEAR OR DOOR Light Off Intermittently While Gear Is In Transit
SCHEM 1	Landing Gear and Door Position Indicating and Warning System Electrical Schematic
SCHEM 2	Truck Position Indicating System Electrical Schematic
SCHEM 3	Tail Skid Position Indicating System Electrical Schematic

EFFECTIVITY: ALL

001B

32-61-00
Page 102
Jun 15/95

LOCKHEED
MAINTENANCE MANUAL

COMPONENT	QTY	AREA/ACCESS	REFERENCE
BOX, INDICATOR LIGHTS CONTROL (ILCB)	1	FESC/112AB, 211CB	33-17-04
ILCB CARD 1A12	1	IN ILCB	.
ILCB CARD 1A13	1	IN ILCB	.
ILCB CARD 1A27	1	IN ILCB	.
ILCB CARD 1A33	1	IN ILCB	.
BOX, PROXIMITY SWITCH CARD (PSCB)	1	MESC/192K, 192AE	31-22-01
PSCB CARD J2	1	IN PSCB	.
PSCB CARD J6	1	IN PSCB	.
PSCB CARD J7	1	IN PSCB	.
PSCB CARD J8	1	IN PSCB	.
PSCB CARD J10	1	IN PSCB	.
PSCB CARD J13	1	IN PSCB	.
PSCB CARD J28	1	IN PSCB	.
BOX, PROXIMITY SWITCH LOGIC (PSLB)	1	MESC/192K, 192AE	31-22-02
PSLB CARD J3	1	IN PSLB	.
PSLB CARD J4	1	IN PSLB	.
PSLB CARD J7	1	IN PSLB	.
PSLB CARD J8	1	IN PSLB	.
SENSOR			
L&R MLG DOWNLOCK	2	ON MLG JURY BRACE	32-61-02
L&R MLG UPLOCK	2	MLG WHEEL WELL	32-61-07
L&R MLG UP POSITION	2	MLG WHEEL WELL	32-61-02
NLG DOWNLOCK	1	ON NLG JURY BRACE	32-61-05
NLG UPLOCK	1	ON UPLOCK ASSY	32-61-04
NLG UP POSITION	2	NLG WHEEL WELL	32-61-06
TAILSKID DOWN	1	ON TAILSKID/439AZ	32-61-12
TAILSKID UP	1	ON TAILSKID/439AZ	32-61-12
TRUCK UNLEVEL	2	ON MLG TRUCK BEAM	32-61-08
SWITCH, LANDING GEAR CONTROL	1	FLT STA/P2	32-31-14
TIRE, MLG	8	MLG	32-41-01
TRUCK POSITIONER, MLG	2	ON MLG TRUCK BEAM	32-32-03

*SEE WM EQUIPMENT LIST

M1-0000-32-074

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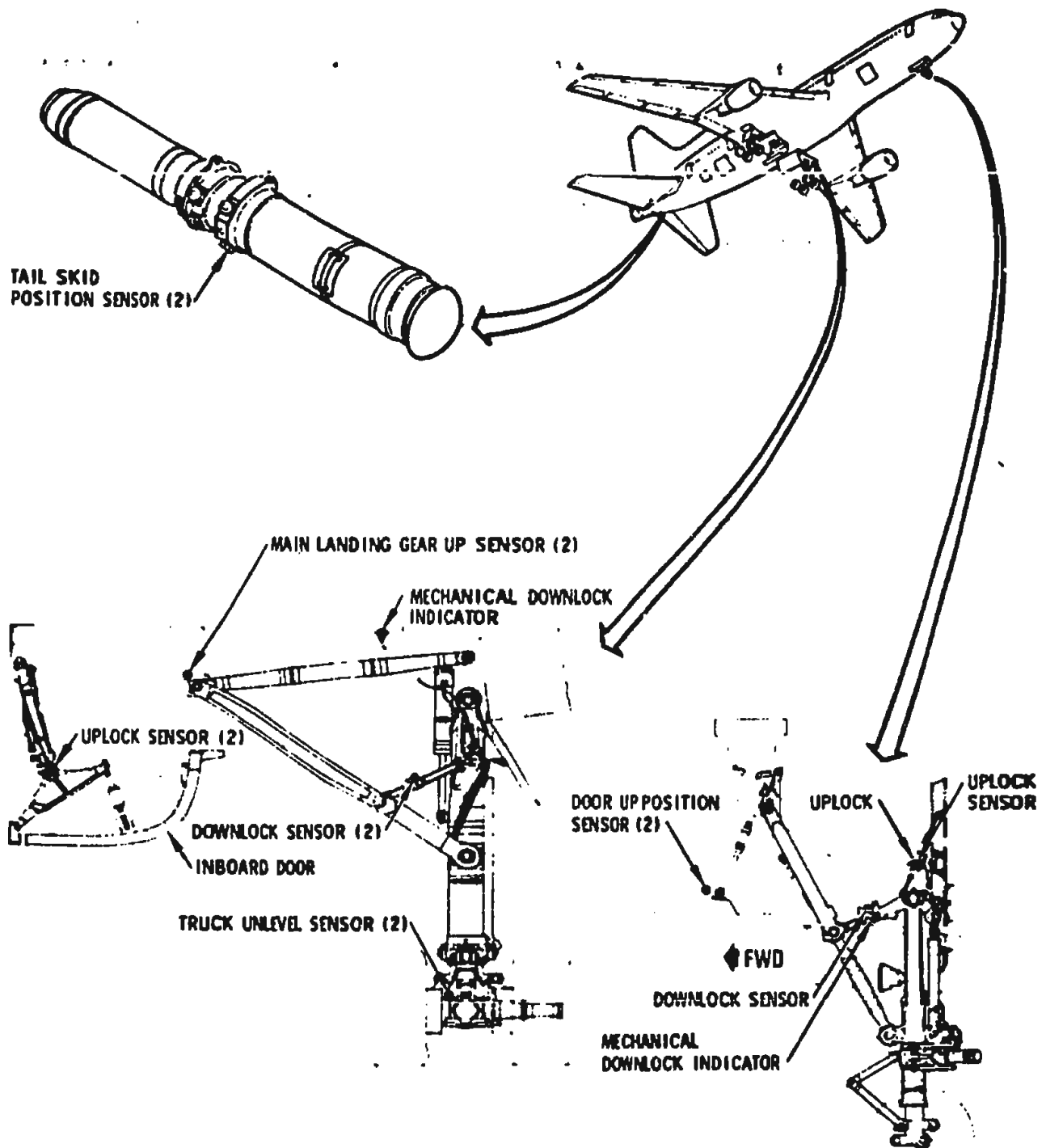
Component Location Index
Figure 101

EFFECTIVITY: ALL

001B

32-61-00
Page 103
Mar 15/81

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-062

Landing Gear and Door Position Indicating and Warning System
Component Locator
Figure 102 (Sheet 1)

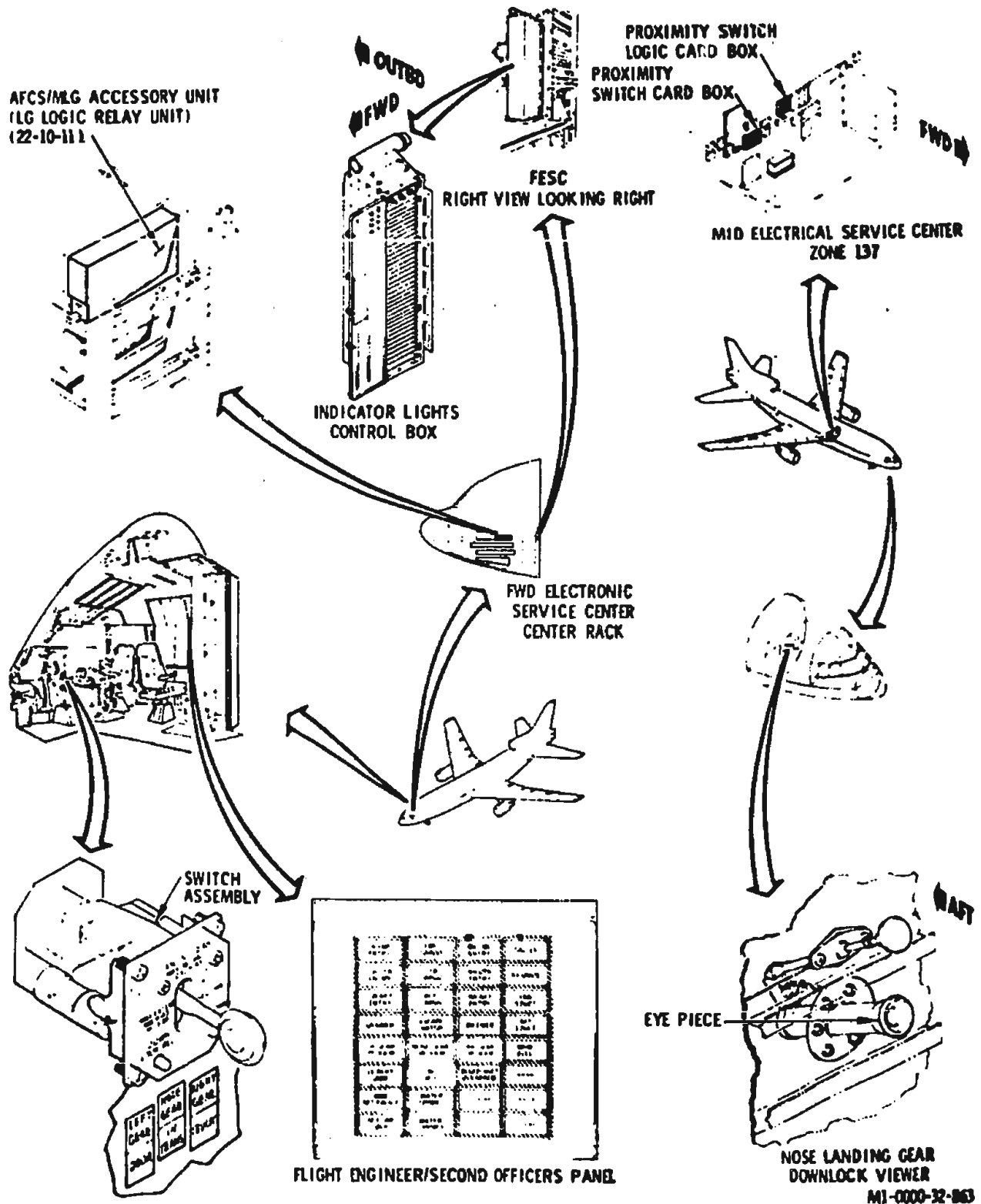
EFFECTIVITY: ALL

32-61-00
Page 104
Mar 15/81

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LOCKHEED
MAINTENANCE MANUAL



Landing Gear and Door Position Indicating and Warning System
Component Locator
Figure 102 (Sheet 2)

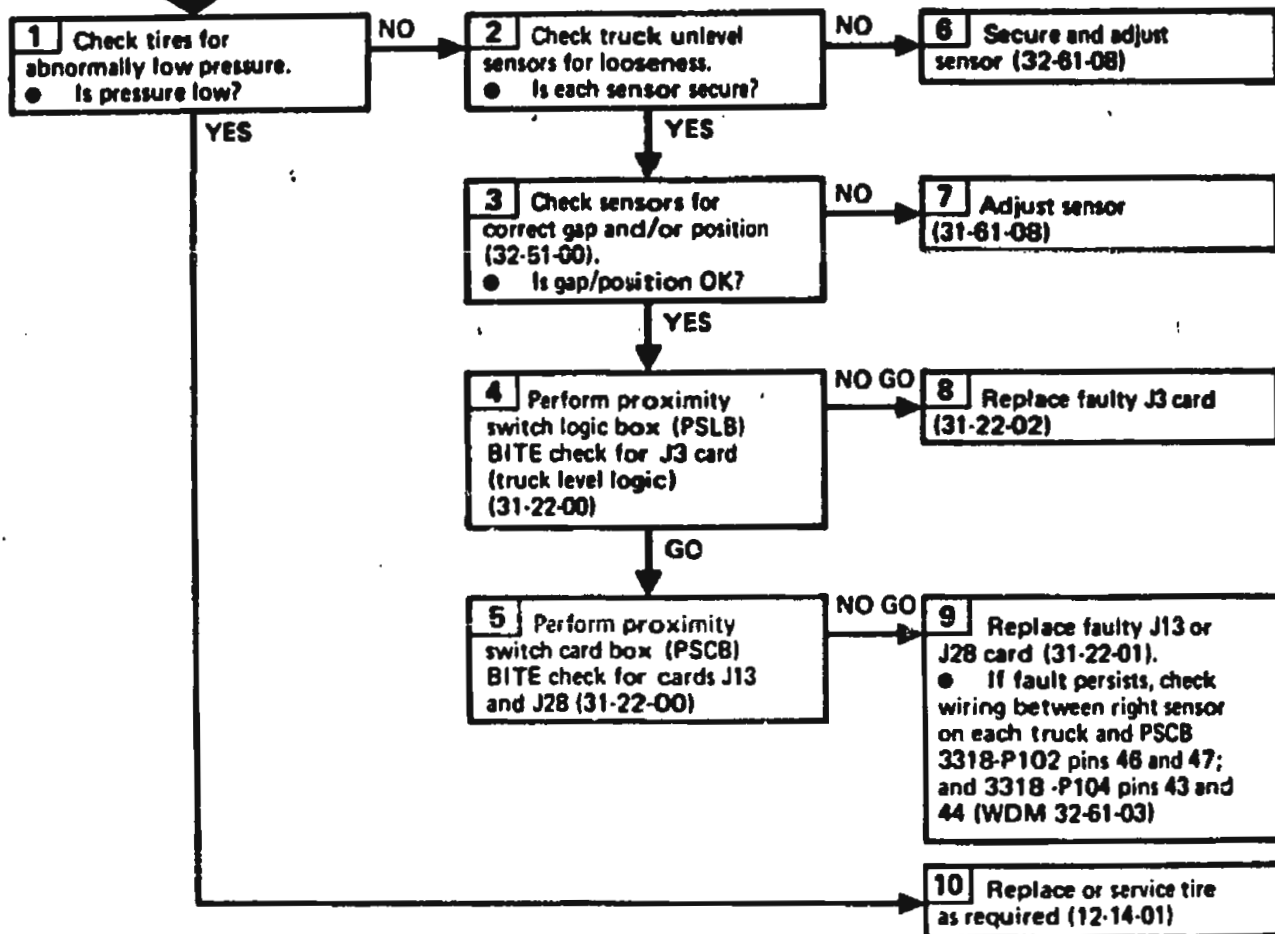
EFFECTIVITY: ALL

32-61-00
Page 105
Mar 15/81

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MAINTENANCE MANUAL

TRUCK Light On Intermittently



PREREQUISITES

Aircraft on Ground
Elec Pwr (24-00-00)
Both truck levels (right angle to strut)
CB's in: CB2-F 16, L8; CB3-H3, H4

M1-0001-32-725

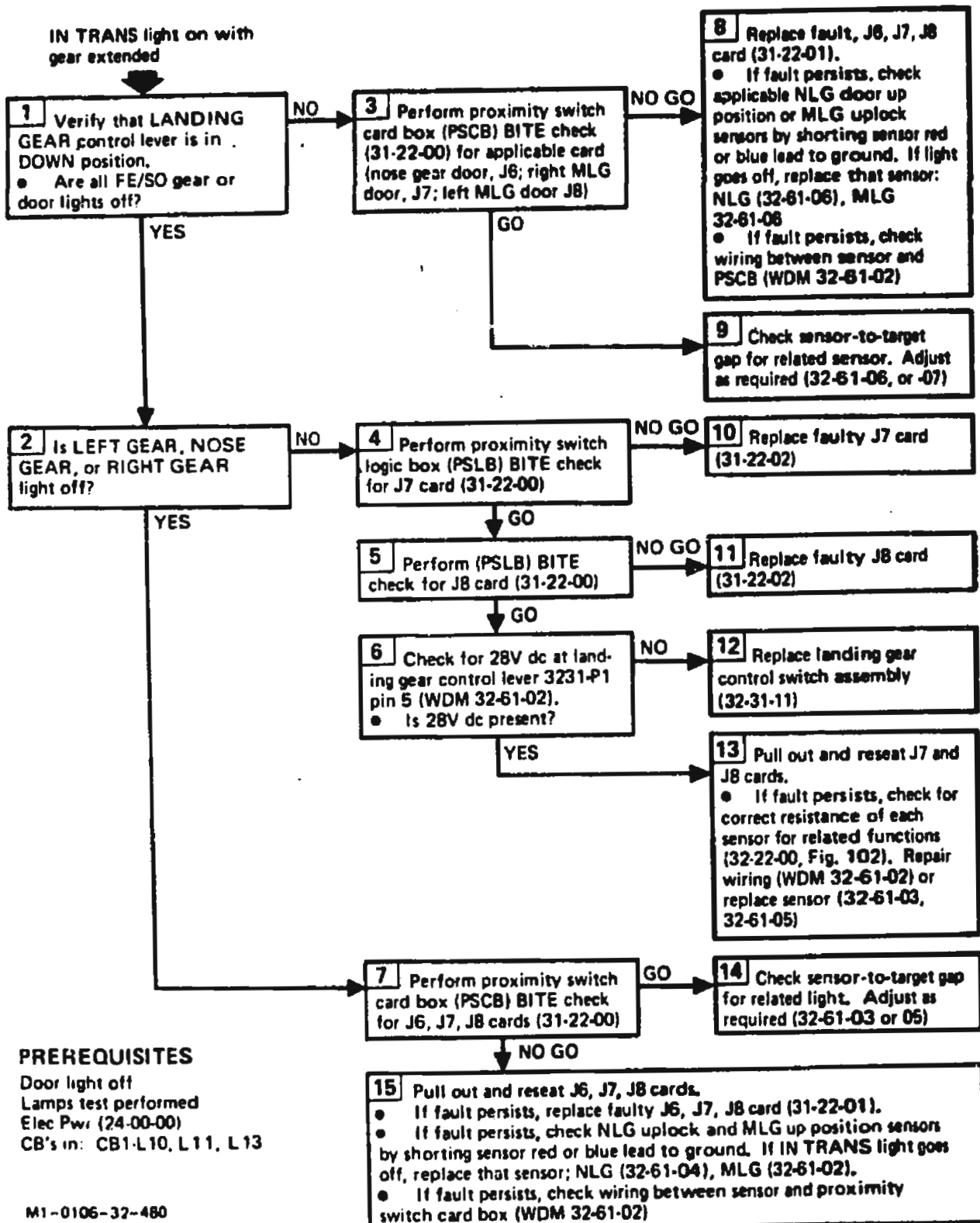
TRUCK Light On Intermittently
Figure 103

EFFECTIVITY: ALL

32-61-00
Page 106
Mar 15/81

R
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001B

LOCKHEED
MAINTENANCE MANUAL



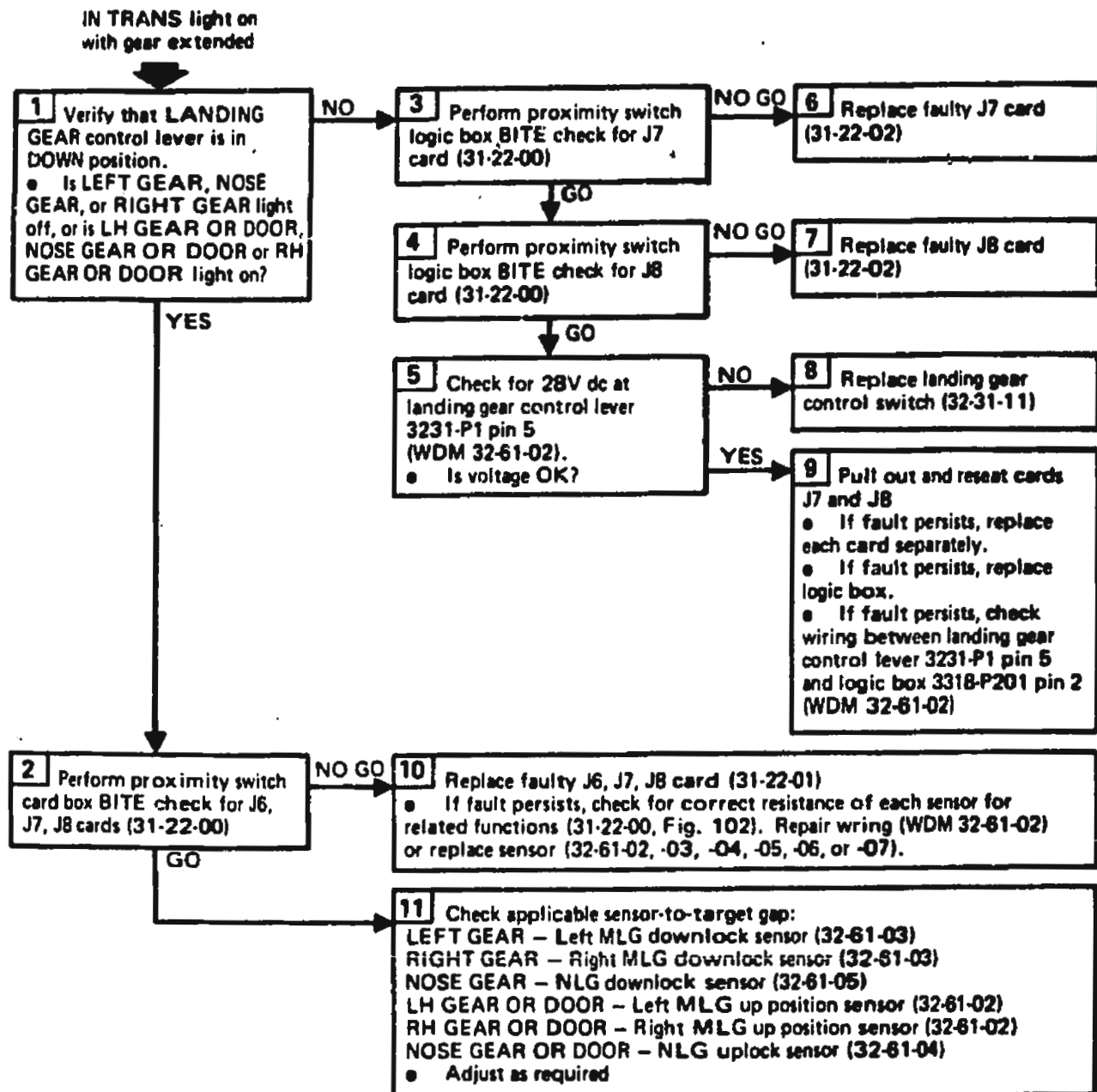
IN TRANS Light On With Gear Extended
Figure 104

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EFFECTIVITY: 001-030

32-61-00
Page 107
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



PREREQUISITES
DOOR light off
Lamps test performed
Electrical Power (24-00-00)
CB's in. CB1-L10, L11, L13

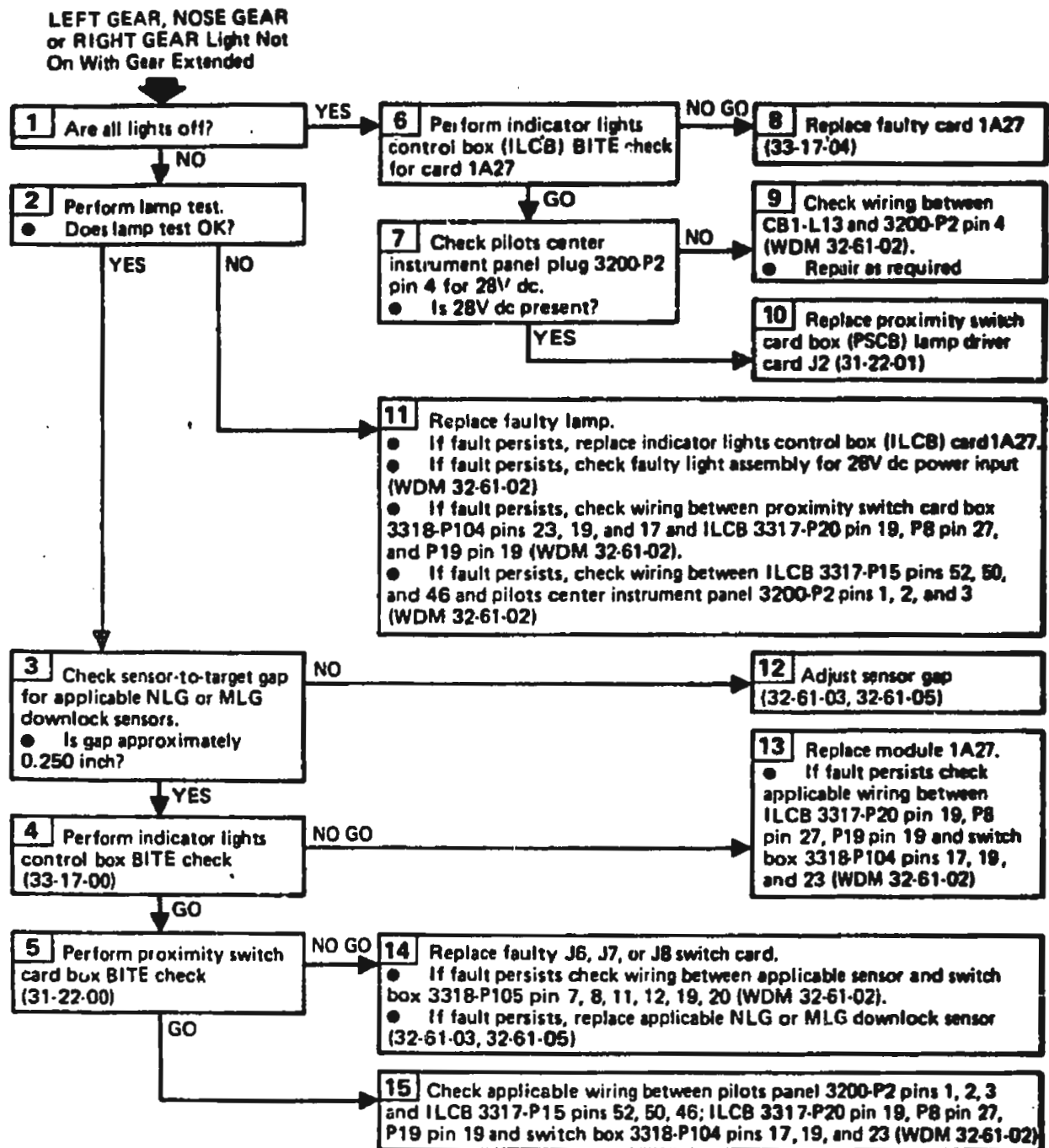
M1-0106-32-600

IN TRANS Light On With Gear Extended
Figure 104

EFFECTIVITY: 031-999

32-61-00
Page 108
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



PREREQUISITES

Door and IN TRANS lights came on, then went off
Electrical Power (24-00-00)
CB's in: CB1-L10, L11, L13

M1-0102-32-585

LEFT GEAR, NOSE GEAR, RIGHT GEAR Light Not On With Gear Extended
Figure 105

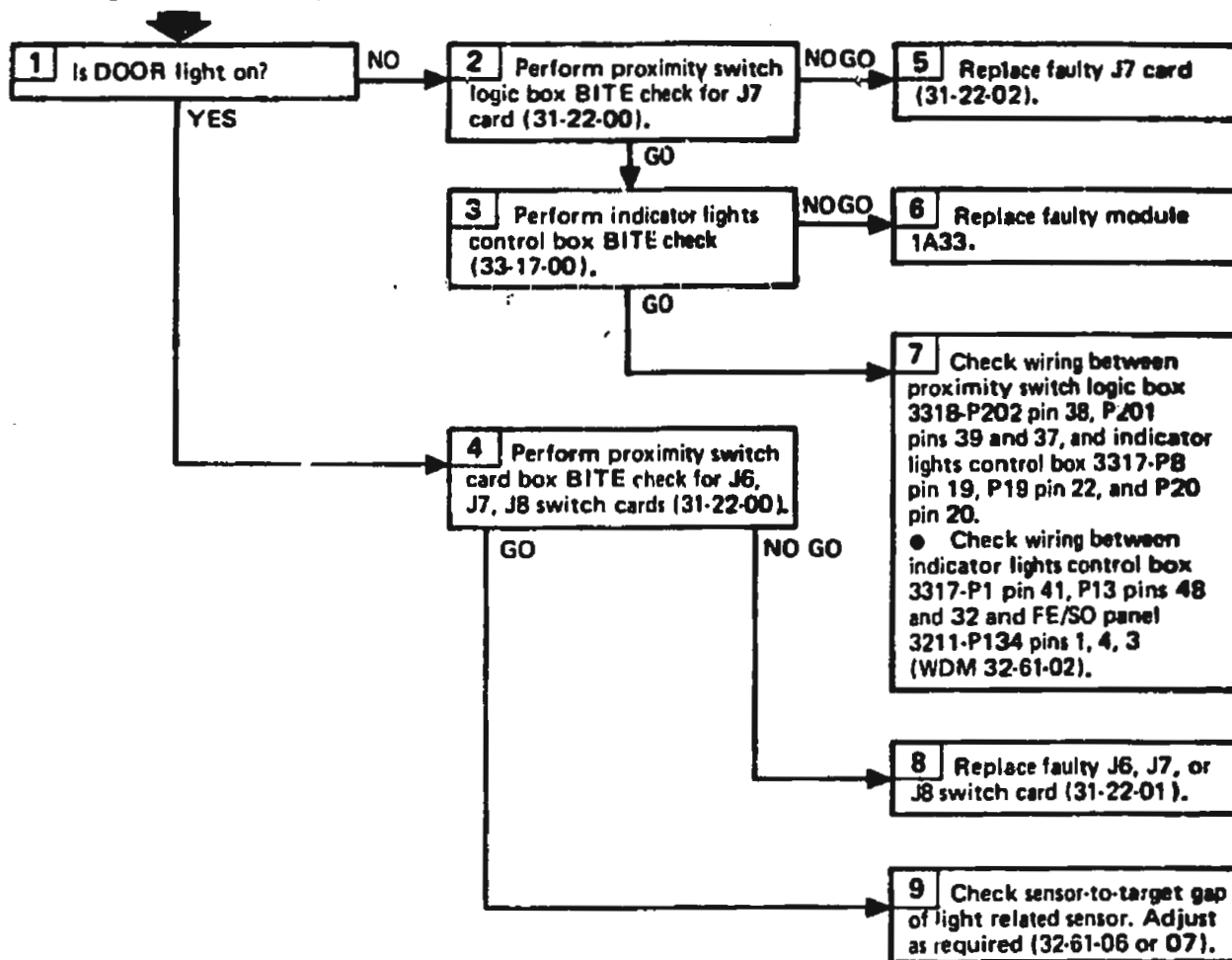
R
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001B

EFFECTIVITY: ALL

32-61-00
Page 169
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL

LH GEAR (OR) DOOR, RH GEAR
(OR) DOOR, or NOSE GEAR (OR)
DOOR Light On With Gear Up or Down



PREREQUISITES

Electrical Power (24-00-00)
CB's in: CB1-L10, L11, L13
Doors closed

M1-0102-32-586

LH GEAR OR DOOR, NOSE GEAR OR DOOR, RH GEAR OR DOOR Light On
With Gear Up or Down
Figure 106

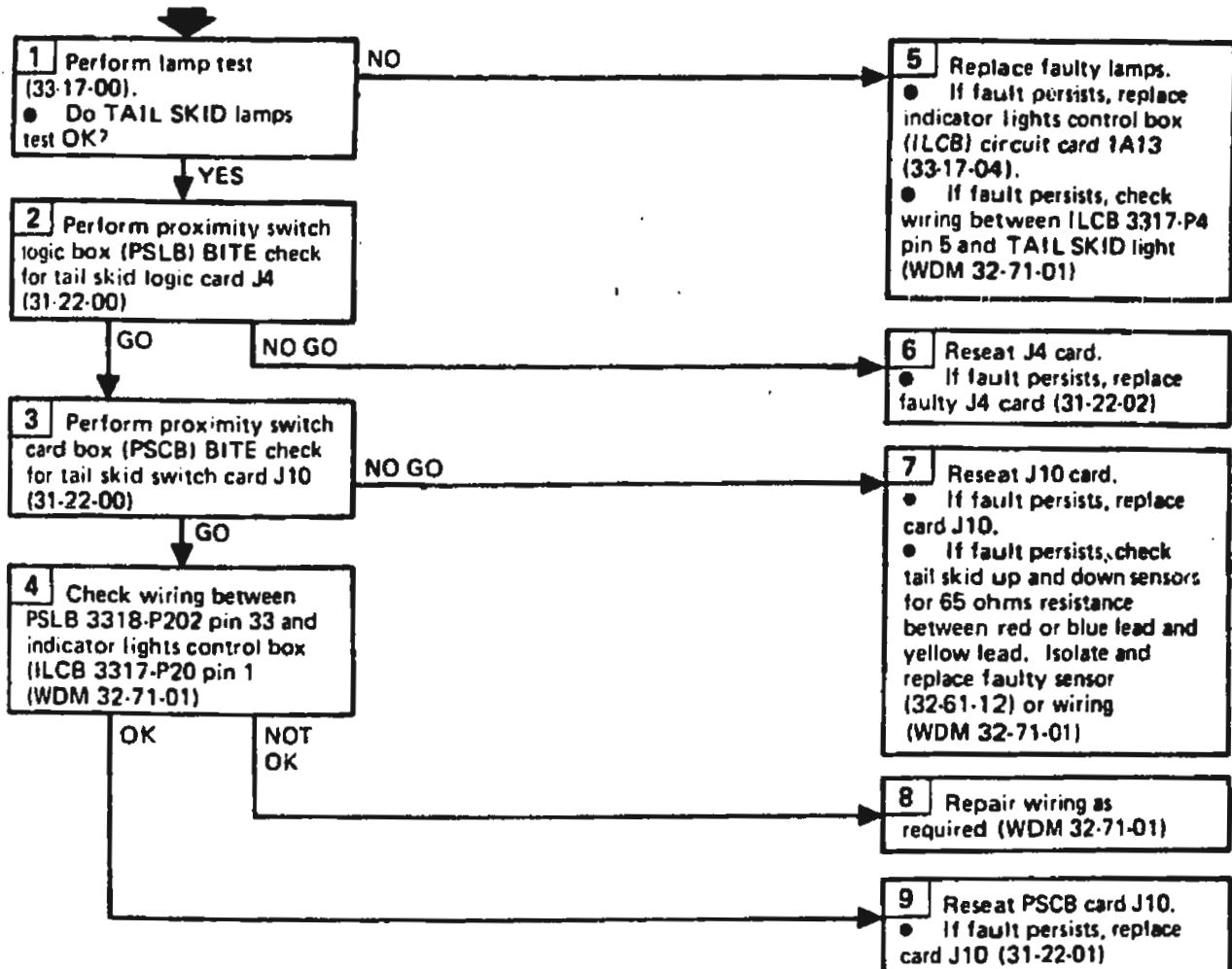
R
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001B

EFFECTIVITY: ALL

32-61-00
Page 110
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL

TAIL SKID Light Does Not
Come On During Tail Skid
Retraction or Extension



PREREQUISITES

Electrical power on (24-00-00)
CB's in. CB1-L13, CB2-F13, CB3-H4

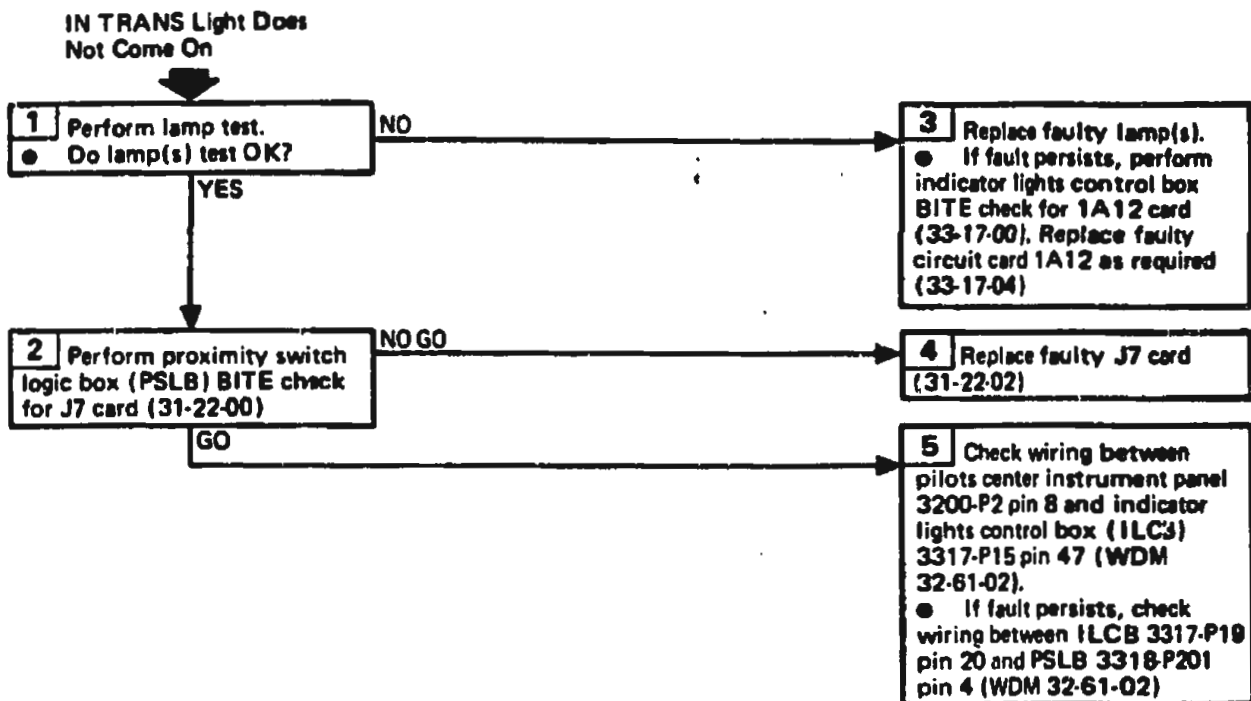
M1-0102-32-594

TAIL SKID Light Does Not Come On During Tail Skid
Retraction Or Extension
Figure 107

RR
001B EFFECTIVITY: ALL

32-61-00
Page 111
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



PREREQUISITES

DOOR light off
Electrical Power (24-00-00)
CB's in: CB1-L10, L11, L13

M1-0100-32-585

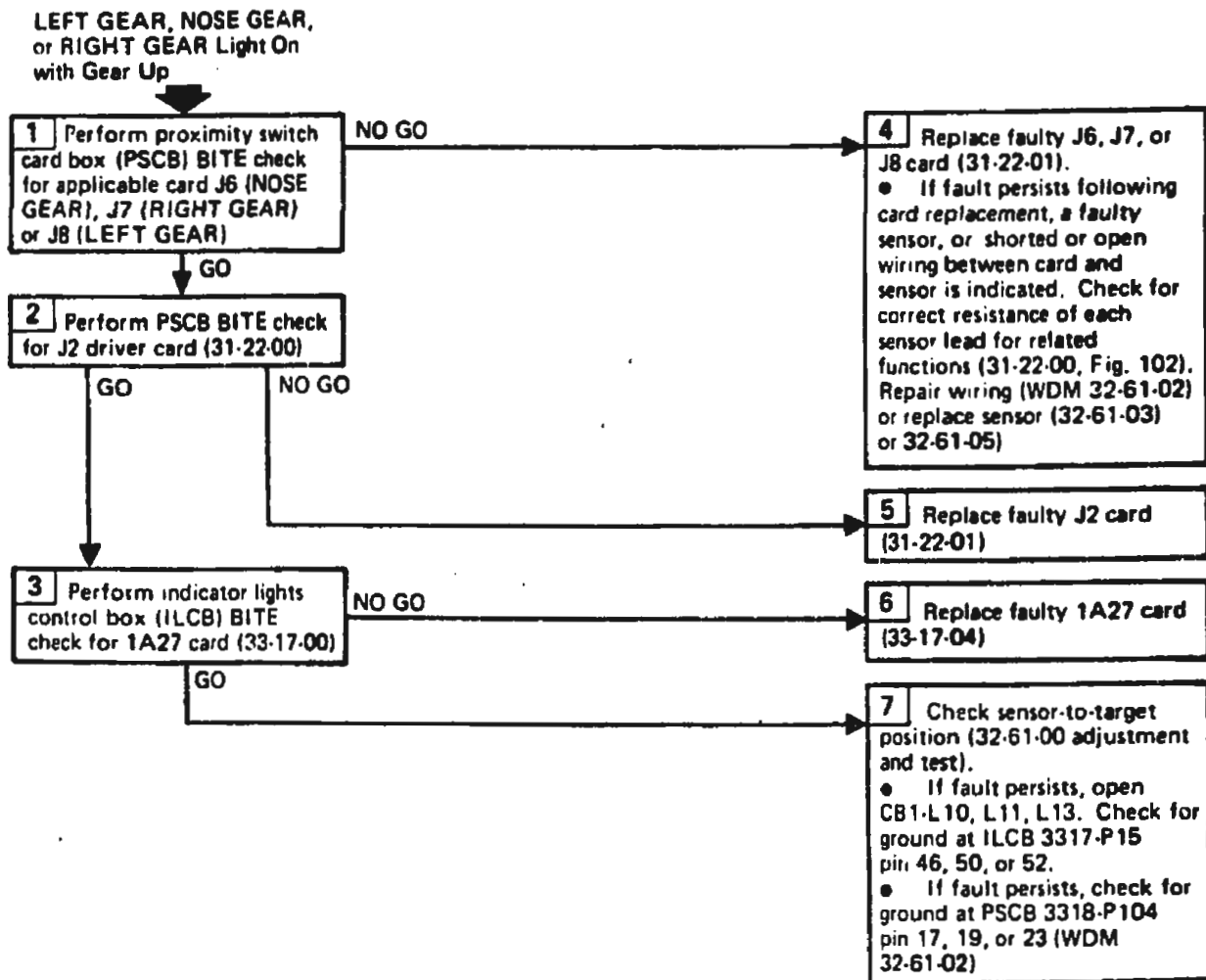
IN TRANS Light Does Not Come On
Figure 108

R
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001B

EFFECTIVITY: ALL

32-61-00
Page 112
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



PREREQUISITES

Gear retracted or simulated retracted using shades on
NLG and MLG downlock sensors (32-61-00 adjustment and test)
Electrical Power (24-00-00)
CB's in: CB1-L10, L11, L13

M1-0101-32-610

LEFT GEAR, NOSE GEAR, RIGHT GEAR Light On With Gear Up
Figure 109

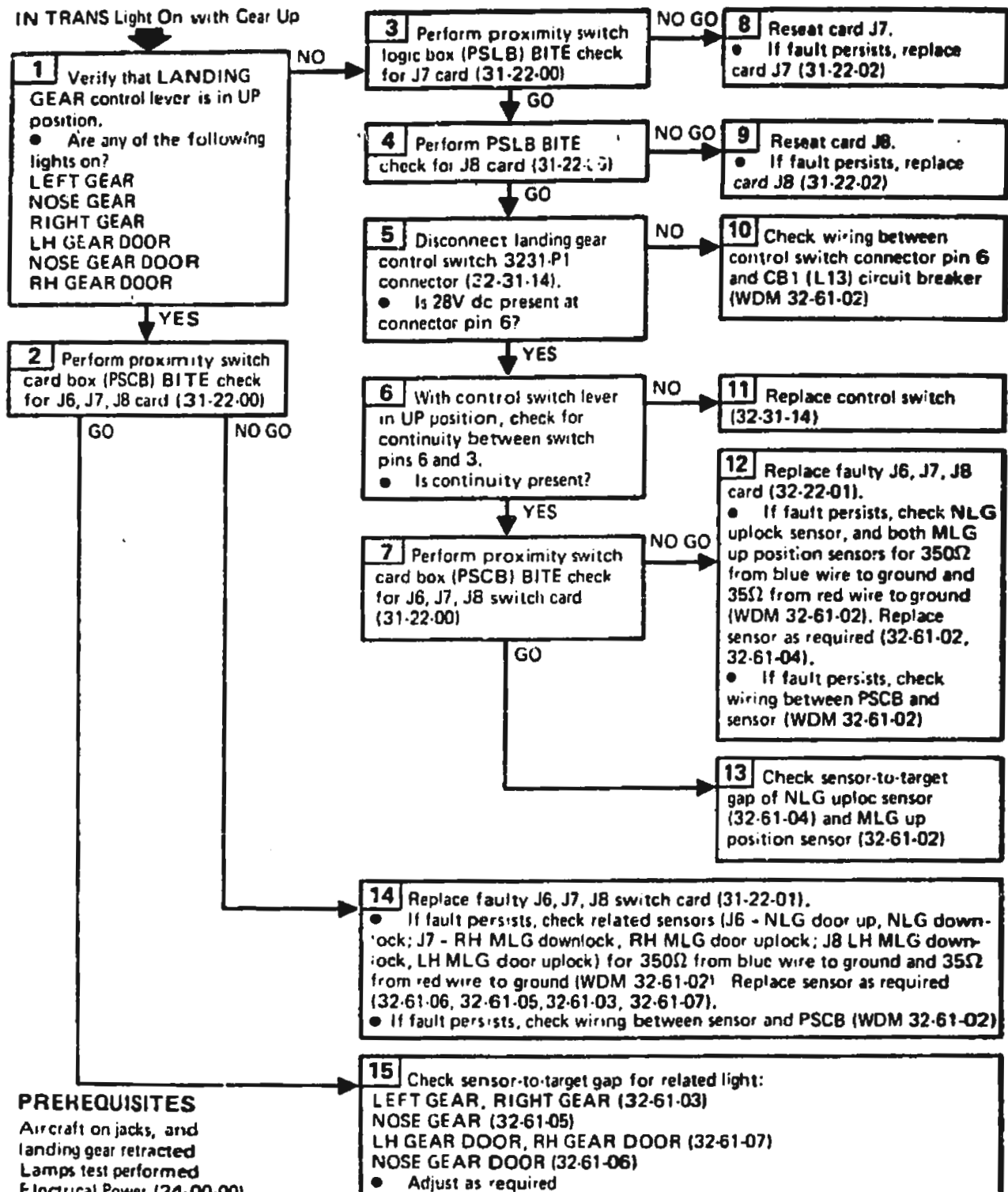
R
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EFFECTIVITY: ALL

32-61-00
Page 113
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL

IN TRANS Light On with Gear Up



PREREQUISITES

Aircraft on jacks, and landing gear retracted
Lamps test performed
Electrical Power (24-00-00)
CB's in: CB1-L10, L11, L13

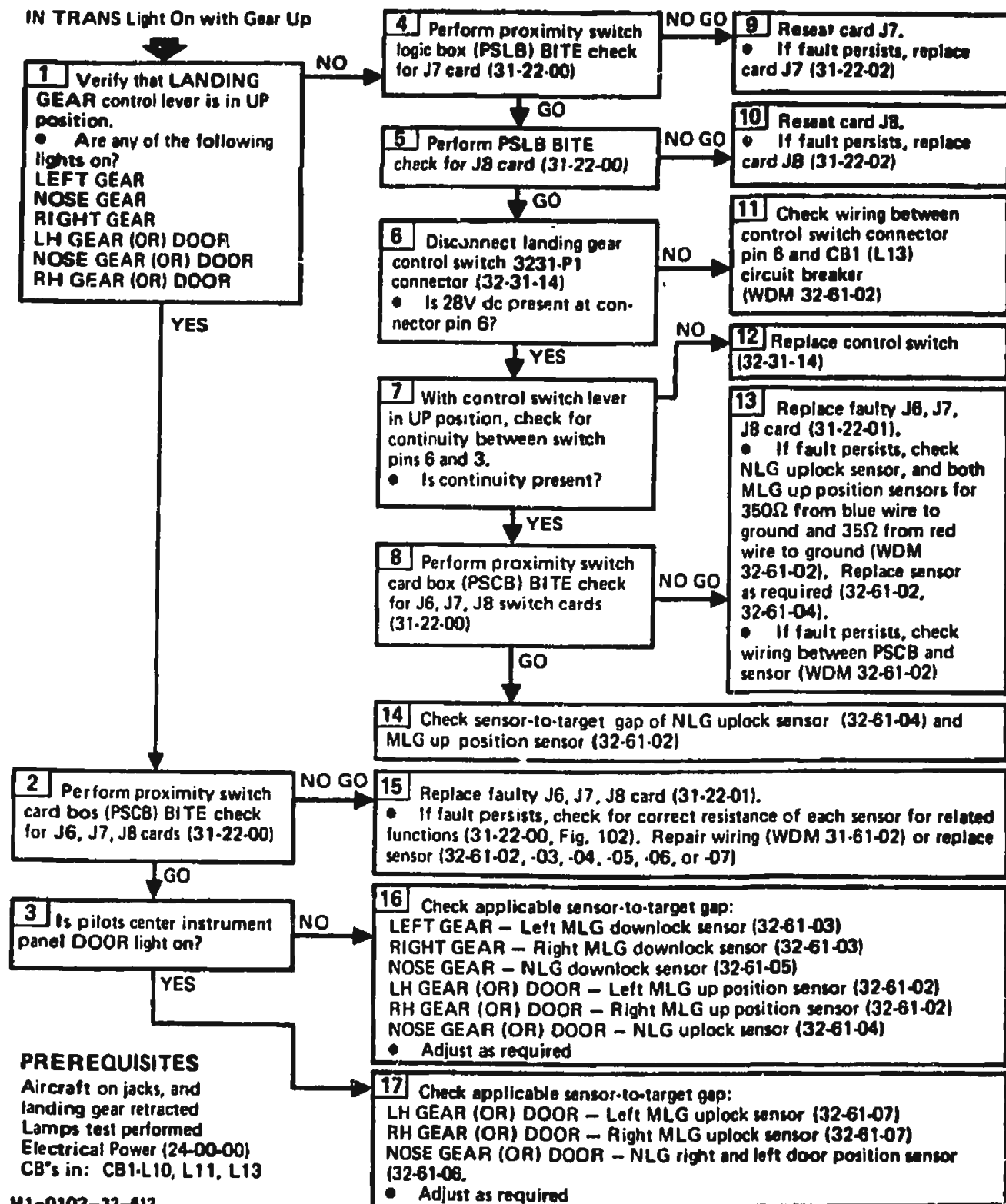
M1-70901-32-611

IN TRANS Light On With Gear Retracted
Figure 110

R
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001B EFFECTIVITY: 001-030

32-61-00
Page 114
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL



IN TRANS Light On With Gear Retracted
Figure 110

LOCKHEED

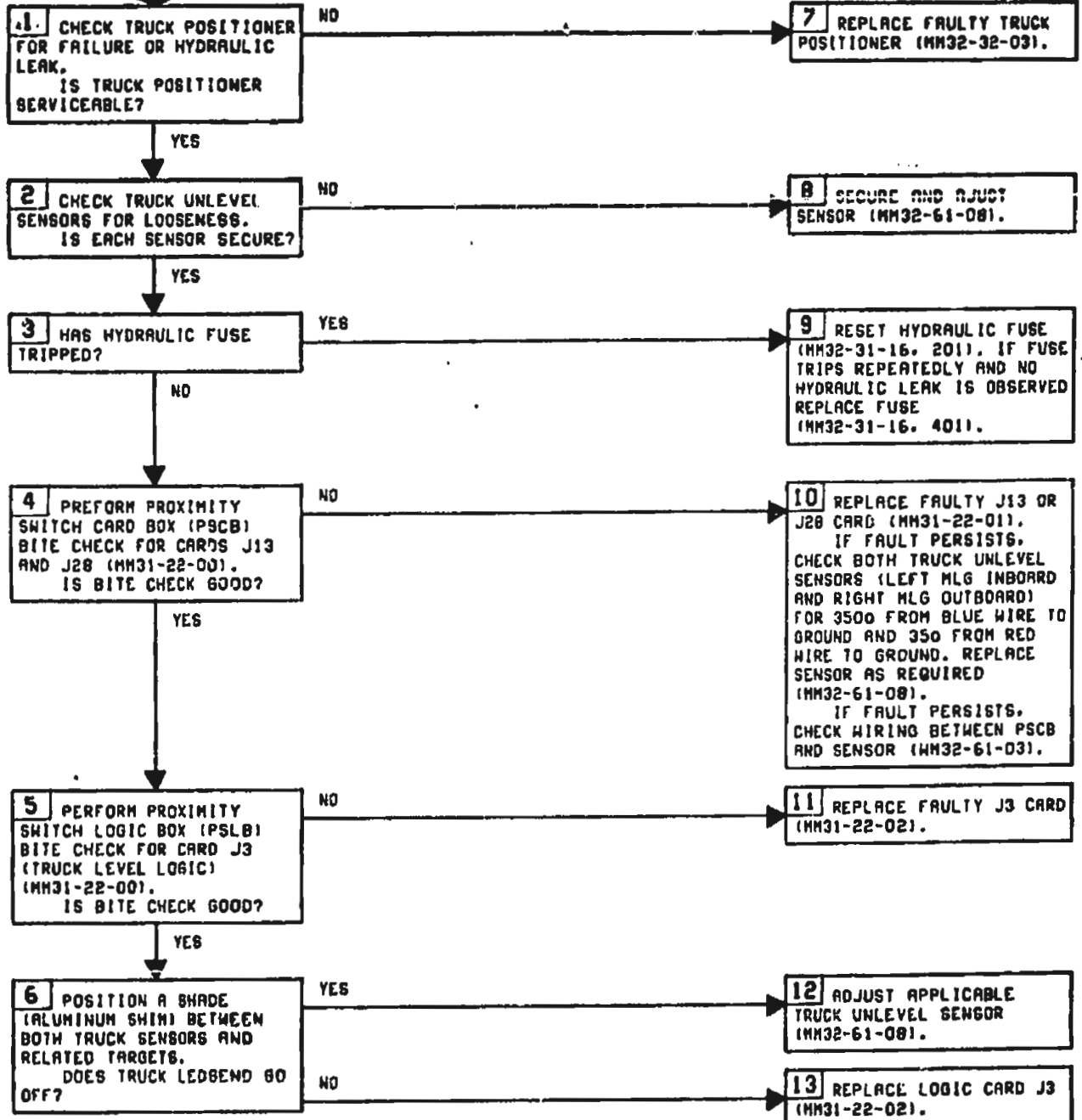


MAINTENANCE MANUAL

PREREQUISITES

ELECTRICAL POWER (MM24-00-00)
BOTH TRUCKS LEVEL (RIGHT ANGLE TO STRUT)
CB'S IN: CB2-F16, L9
CB3-H3, H4

TRUCK LEGEND ON, TRUCK LEVEL



MI-0004-32-615

R
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TRUCK Legend On, Truck Level
Figure 111

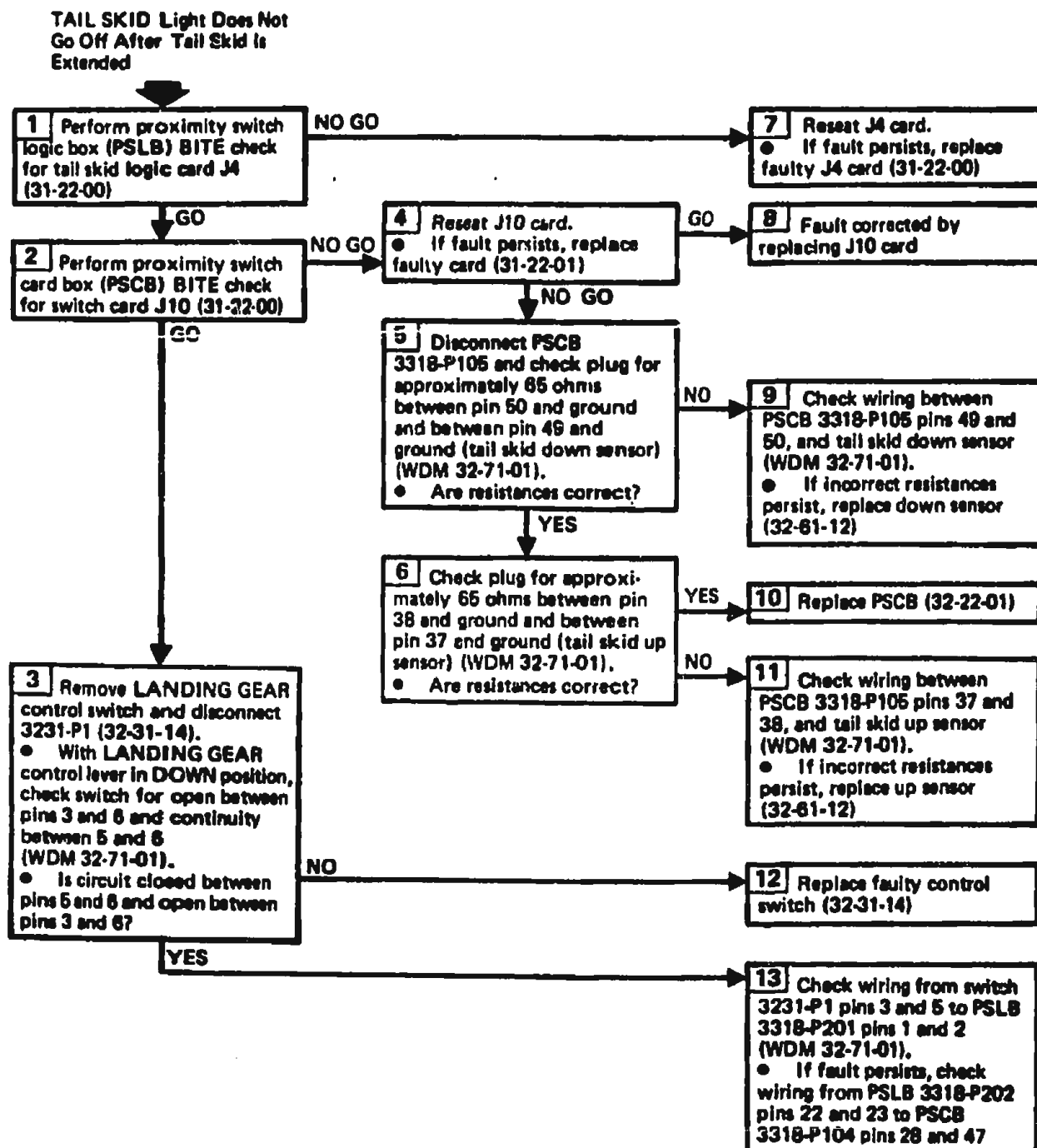
EFFECTIVITY: ALL

001B

32-61-00
Page 116
Jul 15/83

LOCKHEED

MAINTENANCE MANUAL



PREREQUISITES

Electrical Power on (24-00-00)
 CB's in: CB1-L13, CB2-F13, CB3-H4
 Landing gear downlock safety pins installed
 Hydraulic System C pressure off (29-11-00)

M1-0101-32-668

TAIL SKID Light Does Not Go Off After Tail Skid Extension
Figure 112

R EFFECTIVITY: ALL
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 001B

32-61-00
 Page 117
 Aug 15/81

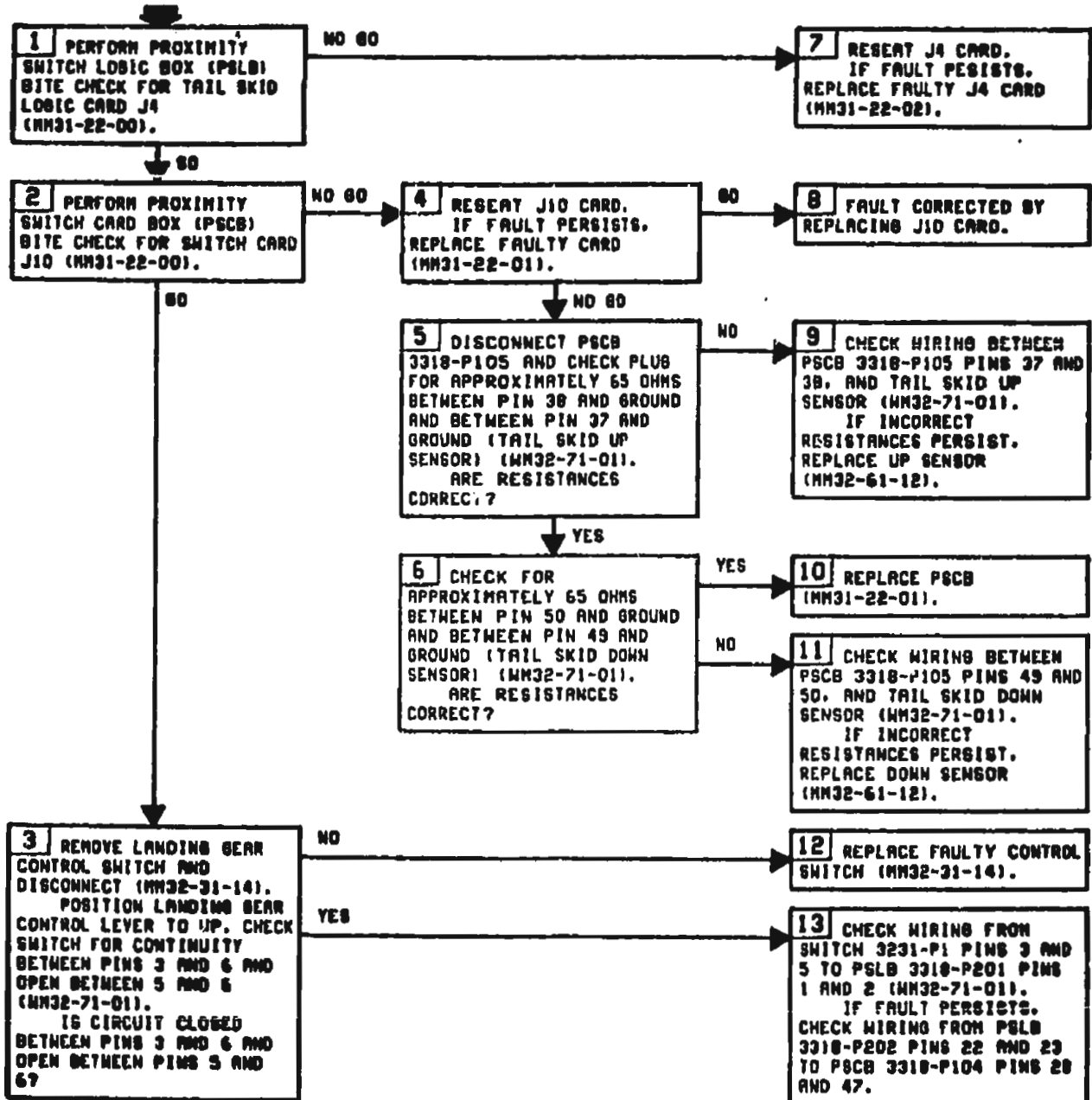
LOCKHEED

MAINTENANCE MANUAL

PREREQUISITES

TAIL SKID LIGHT DOES NOT GO OFF AFTER TAIL SKID IS RETRACTED

ELECTRICAL POWER ON (MM24-00-00)
CB'S IN: CB1-L13, CB2-F13, CB3-H4
LANDING GEAR DOWNLOCK SAFETY PINS INSTALLED
HYDRAULIC SYSTEM C PRESSURE OFF (MM20-11-00)



NI-0108-20-430

R TAIL SKID Light Does Not Go Off After Tail Skid Retraction
R Figure 113

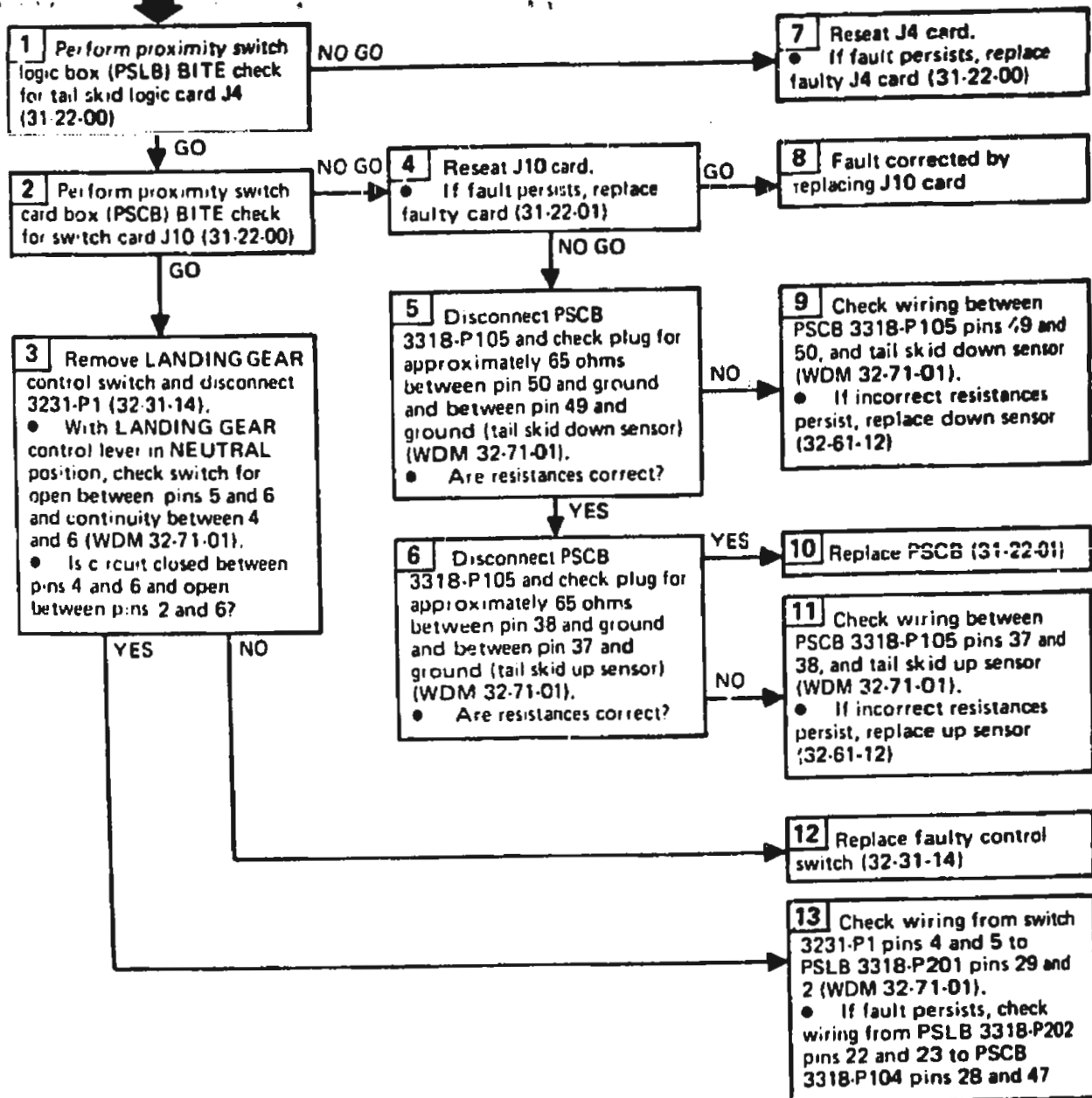
EFFECTIVITY: ALL

32-61-00
Page 118
Nov 15/83

001B

LOCKHEED
MAINTENANCE MANUAL

TAIL SKID Light Goes On
After Tail Skid Is Retracted
and LANDING GEAR Control
Lever Is In Neutral



PREREQUISITES

Electrical Power on (24-00-00)
CB's in: CB1-L13, CB2-F13, CB3-H4
Landing gear downlock safety pins installed
Hydraulic system C pressure off (29-11-00)

M1-0100-32-890

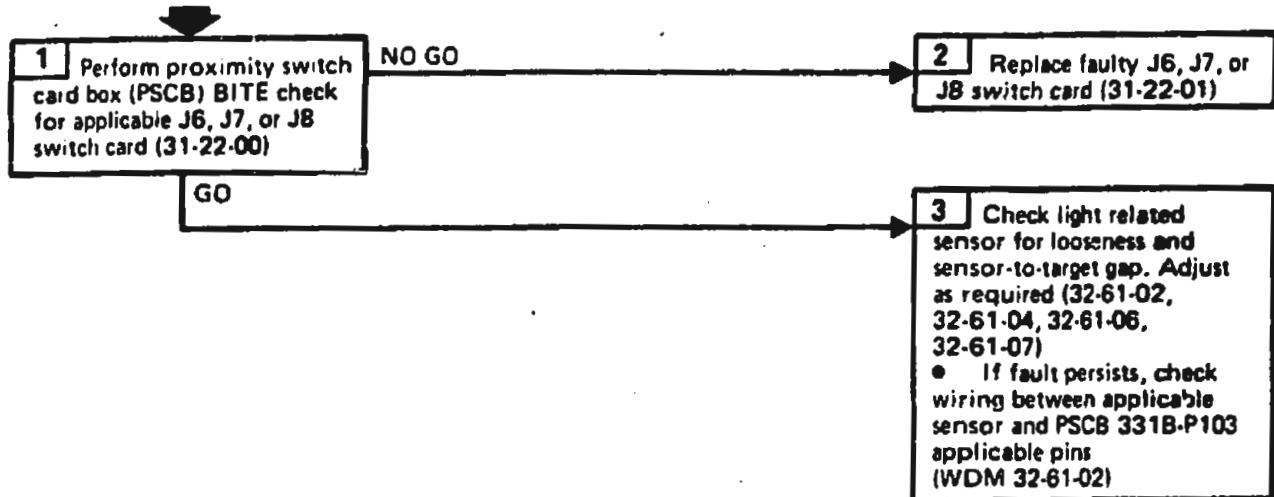
TAIL SKID Light Goes On After Tail Skid Retraction With
LANDING GEAR Control Lever In NEUTRAL
Figure 114

R EFFECTIVITY: ALL
R
001B

32-61-00
Page 119
Aug 15/81

LOCKHEED
MAINTENANCE MANUAL

LH GEAR (OR) DOOR RH
GEAR (OR) DOOR, or NOSE
GEAR DOOR Light Off
Intermittently While Gear In Transit



PREREQUISITES

Electrical Power (24-00-00)
CB's in: CB1-L10, L11, L13
Doors closed

M1-0100-32-891

RH GEAR OR DOOR, LH GEAR OR DOOR, or NOSE GEAR OR DOOR
Light Off Intermittently While Gear Is In Transit
Figure 115

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0010 EFFECTIVITY: ALL

32-61-00
Page 120
Aug 15/81



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32-61-00
Page 121/122
Aug 15/82

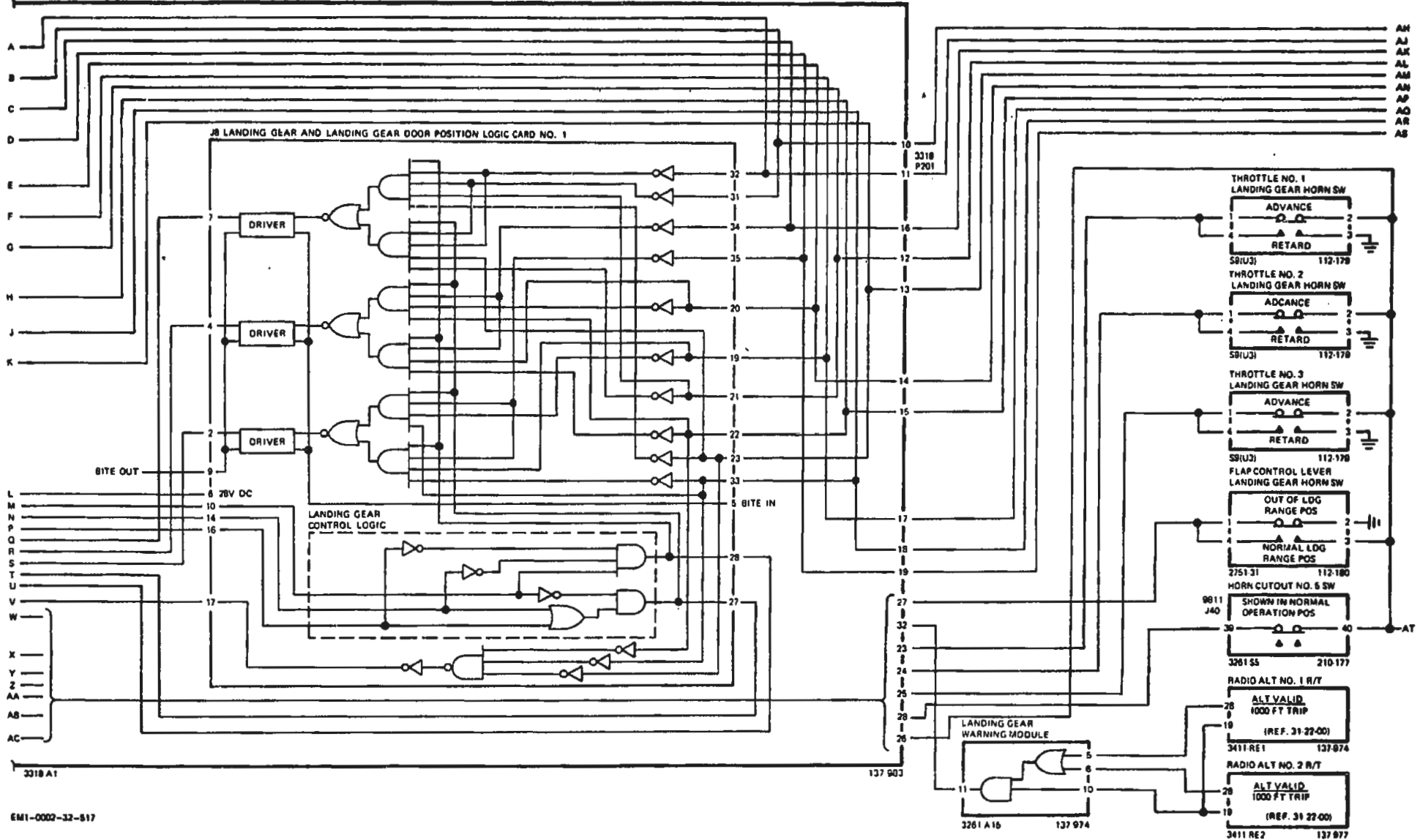


RRR

EFFECTIVITY: 031-999

Page 123/124
Aug 15/82

PROXIMITY SWITCH LOGIC BOX (REF. 31 22-00)



R Landing Gear and Door Position Indicating and Warning System
R Electrical Schematic
R SCHEM 1 (Sheet 2)

EFFECTIVITY: 001-030

32-61-00
Page 125/126
May 15/88

001B



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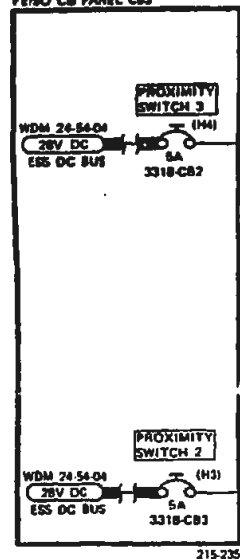
001B

32-61-00
Page 127/128
May 15/88

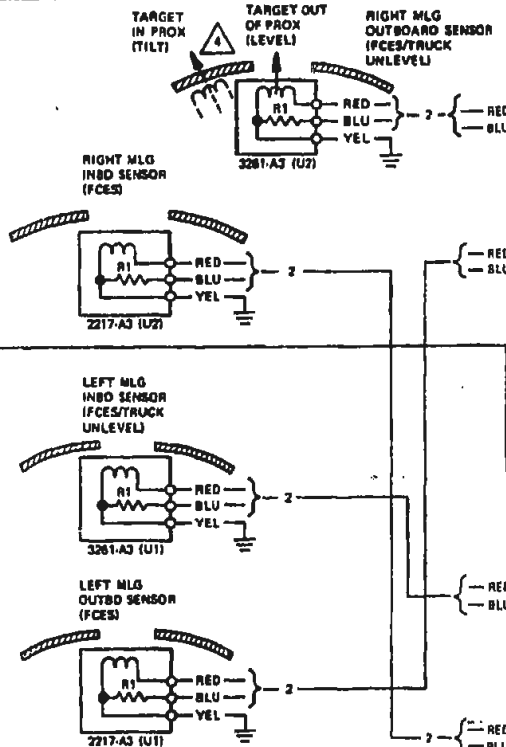


32-61-00
Page 129/130
Mar 15/81

FE/SO CB PANEL CB3



215-235



NOTE

1 - 4 - NO. IN WIRE PROVIDES CODE FOR WIRING DIA CROSS REFERENCE

1 - INVERSION OF OUTPUT

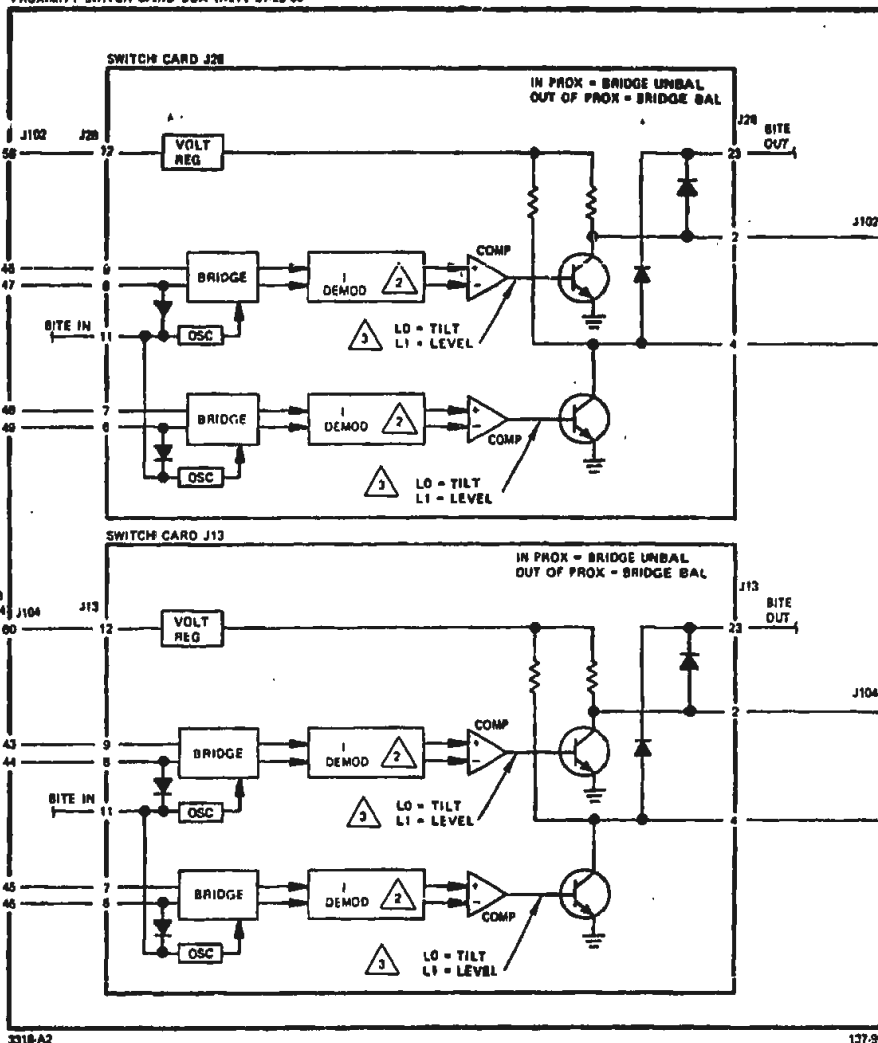
LO - LOGIC 0 (ZERO)

LI - LOGIC 1 (ONE)

4 - APPLIES TO ALL MLG TRUCK POSITION SENSOR/TARGET INSTALLATIONS

CODE	WIRING DIA	SH
1	31-22-08	1
2	32-41-03	1

PROXIMITY SWITCH CARD BOX (REF. 31-22-00)



EMI-0001-32-710

R
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Truck Position Indicating System Electrical Schematic
SCHEM 2 (Sheet 1)

EFFECTIVITY: ALL

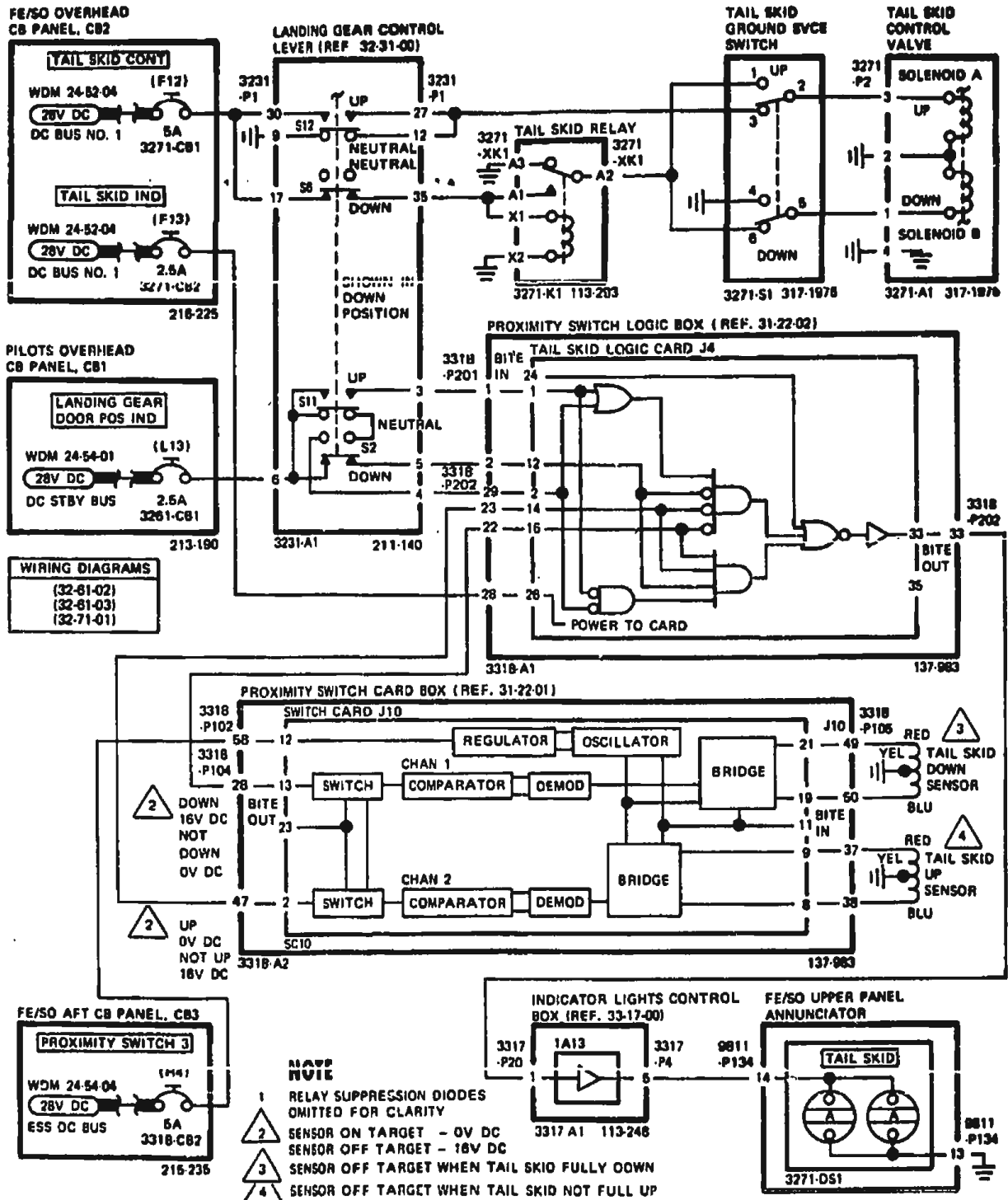
0018

32-61-00
Page 131/132
Jun 15/95



32-61-00
Page 133/134
May 15/88

LOCKHEED
MAINTENANCE MANUAL



EMI-0011-32-128

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**Tail Skid Position Indicating System Electrical Schematic
SCHEM 3**

EFFECTIVITY: ALL

32-61-00
Page 135/136
Dec 15/93

001B

LOCKHEED
MAINTENANCE MANUAL

LANDING GEAR POSITION INDICATING AND WARNING SYSTEMS
MAINTENANCE PRACTICES

1. General

When the landing gear position indicating system has become inoperative, the system can be deactivated so that unwanted or distracting indicator lights are not evident during gear-down revenue flight.

2. Referenced Procedure

32-00-00 Landing Gear - Maintenance Practices

3. Deactivation

NOTE: This deactivation procedure applies only when an aircraft is to be dispatched in accordance with MEL.

R A. GEAR and INTRANS Lights, Pilots Instrument Panel,
R Inoperative.

R (1) Installation of Landing Gear Handle Blocking Device.

R **NOTE:** If landing gear operated normally during last
R leg of flight, landing gear operation is
R considered normal and a gear swing is not
R required.

R (a) On the pilots main instrument panel, install the
R blocking device on the landing gear control switch
R (lever) plate, reference Figure 1.

R (b) Install placard on or in close proximity to the
R landing gear control switch (lever) plate, LANDING
R GEAR BLOCKING PIN INSTALLED-GEAR LOCKED DOWN.

R (c) Make appropriate entry in aircraft log book.

R (2) Airspeed/Mach Indicator Adjustment.

R **NOTE:** On airplanes with SB 093-34-017 incorporated, or
R production equivalent, the airspeed/Mach
R indicators are provided with a mechanically
R variable (2-position) VMO setscrew. The two
R positions are normal (375 knots) and limited
R (270 knots).

R EFFECTIVITY: ALL

001B

32-61-00
Page 201
May 15/85

LOCKHEED
MAINTENANCE MANUAL

- R The VMO setscrew must be adjusted to the limited
R (270 knots) position for gear down flight.
- R (a) On pilots main instrument panel, locate Captain's
R and First Officer's airspeed/Mach indicators.
- R (b) Remove two screws securing access cover on
R lower-left hand corner of airspeed/Mach indicator
R and remove cover (Ref. Fig. 2).
- R (c) Using screwdriver, position setscrew to 270
R position.
- R (d) Verify VMO pointer position coincides with
R setscrew position (270 knots).
- R (e) Install access cover removed in Step 3A(2)(b) and
R secure with two screws.
- R (f) Install appropriate placard in flight station.
- R (g) Make appropriate entry in aircraft log book.
- R B. TRUCK Annunciator Light, Pilots Instrument Panel,
R Inoperative.
- R (1) Airspeed/Mach Indicator Adjustment.
- R (a) Adjust the Airspeed/Mach Indicator as outlined in
R Step 3A(2).
- R (2) Installation of Nose Landing Gear Downlock Pin.
- R (a) Install NLG downlock safety pin (Ref. MM
R 10-10-00).
- R (b) Using lock-wire secure downlock safety pin to jury
R brace (Ref. Fig. 3).
- R (c) Wrap safety pin streamer around jury brace side
R which is adjacent to pin head.
- R (d) Secure streamer with double wrapped lock-wire in
R three places.
- R (3) Installation of Main Landing Gear Downlock Pins.
- R (a) Install both MLG downlock safety pins (Ref. MM
R 10-10-00).
- R (b) Using lock-wire, secure downlock safety pin to
R jury brace (Ref. Fig. 4).

R EFFECTIVITY: ALL
R

001B

32-61-00
Page 202
May 15/85

LOCKHEED



MAINTENANCE MANUAL

R (c) Wrap safety pin streamer around jury brace.

R (d) Secure streamer with double wrapped lock-wire in
R three places.

R (4). Conclusion

R (a) Install placard in the flight station, NOSE & MAIN
R GEAR DOWNLOCK SAFETY PINS INSTALLED.

R (b) Make appropriate entry in aircraft log book.

R C. Main Landing Gear Tire Pressure Check.

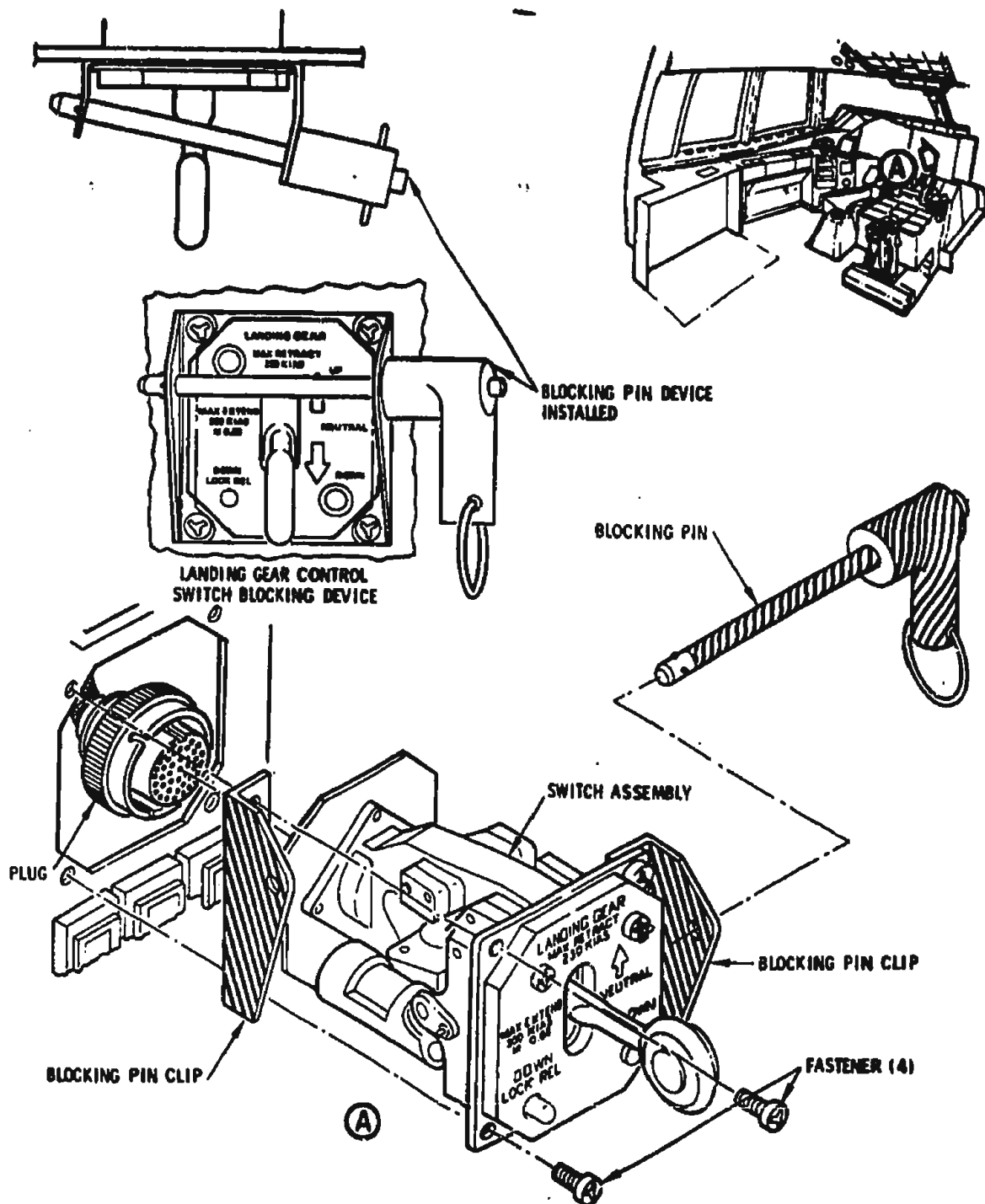
R Check the tire pressure in each main landing gear tire prior
R to each flight and confirm that tire pressure is within
R normal operating range.

R EFFECTIVITY: ALL

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32-61-00
Page 203
May 15/85

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-035

Landing Gear Control Switch With Blocking Device
Figure 1

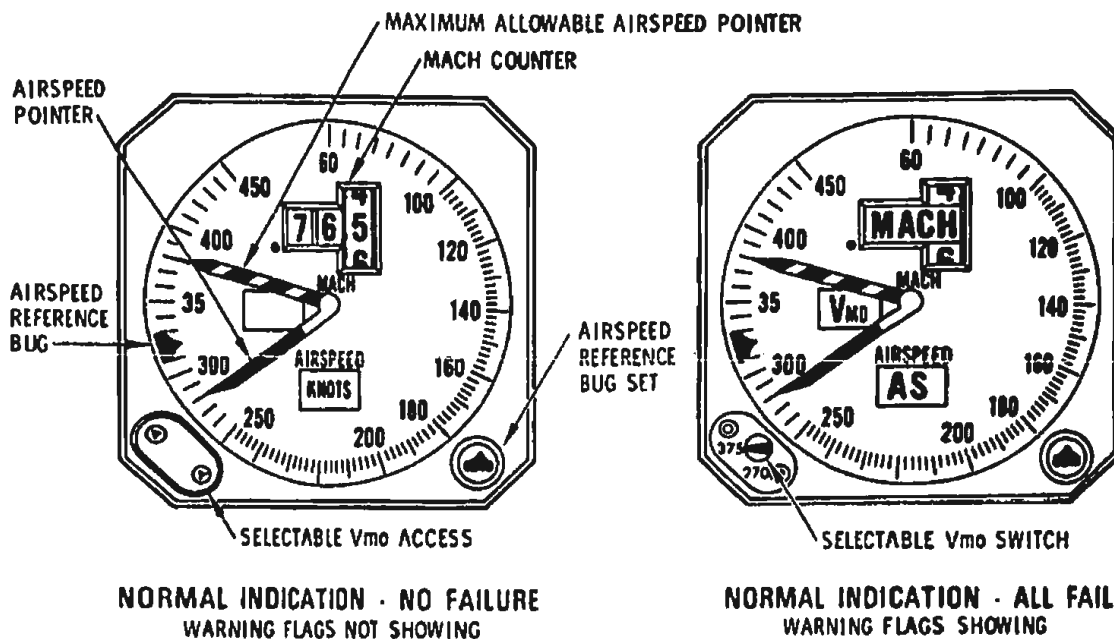
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EFFECTIVITY: ALL

32-61-00
Page 204
May 15/85

LOCKHEED

MAINTENANCE MANUAL



M1-4401-34-1054

Airspeed/Mach Indicator
Figure 2

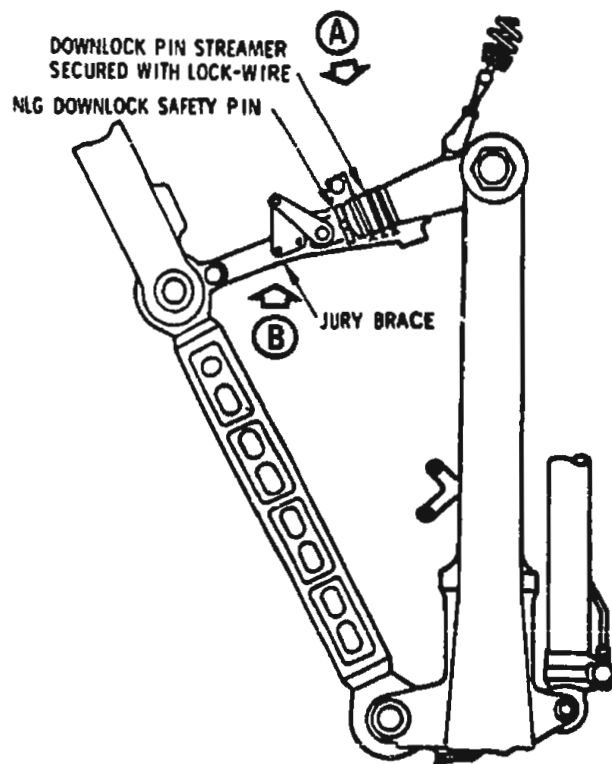
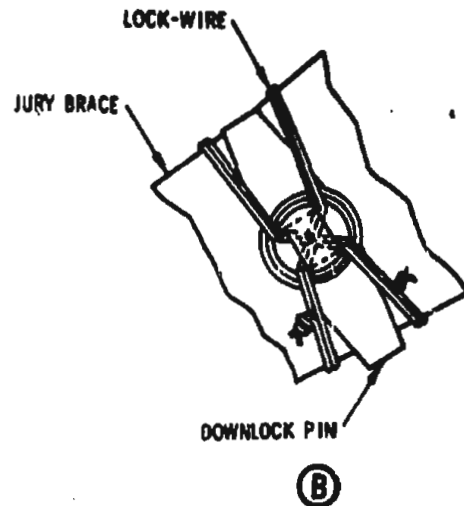
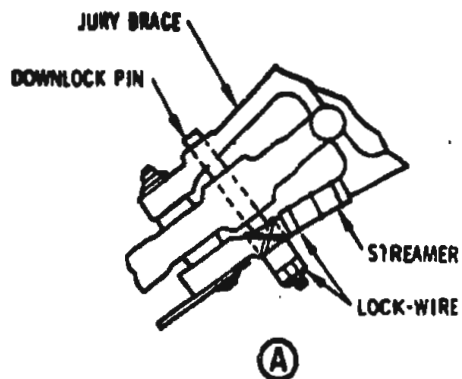
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001B

32-61-00
Page 205
May 15/85

LOCKHEED
MAINTENANCE MANUAL



NOSE LANDING GEAR ASSEMBLY
(VIEW LOOKING INBOARD FROM LH SIDE)

MI-0100-32-510

Nose Landing Gear Downlock Safety Pin Securing
Figure 3

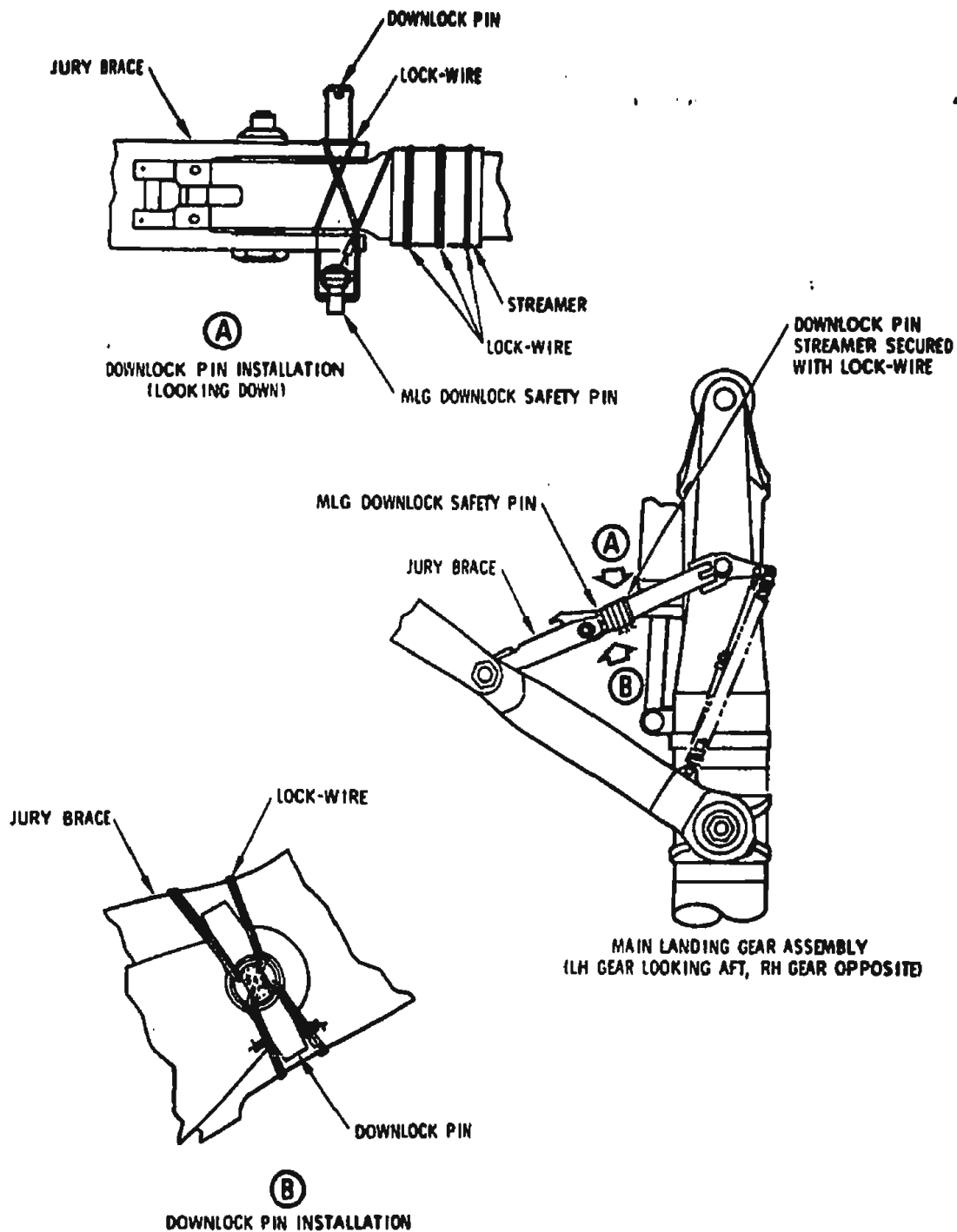
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32-61-00
Page 206
May 15/85

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-511

Main Landing Gear Downlock Safety Pin Securing
Figure 4

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001B

32-61-00
Page 207/208
May 15/85



LANDING GEAR POSITION INDICATING AND WARNING SYSTEM
ADJUSTMENT AND TEST

1. General

This procedure contains instructions for testing the landing gear position indicating and warning system as an electrically functioning system. The test is conducted with the aircraft resting on the landing gear. In addition, the proximity of sensor to the related target is tested except for the two main landing gear up position sensors. To test proximity of sensor to target in case of these two sensors, the aircraft must be jacked and the landing gear retracted and extended (Ref. 32-30-00).

2. Equipment and Materials

Clinometer capable of being read to 0.10 degree

Axle Jack

- R Sensor shade (aluminum shim 0.050 inch thick) (Ref. 20-31-01)
- R Artificial target (steel shim 0.050 inch thick (Ref. 20-31-01
- R and G/ITEL 32-61-06).

3. Referenced Procedures

- 7-12-00 Axle Jacking - Maintenance Practices
- R 20-31-01 Proximity Sensor Target - Maintenance Practices
- 24-00-00 Electrical Power - Maintenance Practices
- 29-11-00 Hydraulic Power System - Maintenance Practices
- 31-22-00 Proximity Switch Card Box and Proximity Logic Box - Maintenance Practices
- 33-17-00 Indicator Lights Test - Maintenance Practices
- 32-33-00 Main Landing Gear Inboard Door - Maintenance Practices
- R G/ITEL
- R 32-61-06 Artificial Target, Local Manufacture

EFFECTIVITY: ALL

001B

32-61-00
Page 501
May 15/86



4. Adjustment/Test

A. Test

- (1) Ensure that downlock safety pins are installed in all three landing gear.
- (2) Turn on electrical power (Ref. 24-00-00).
- (3) Establish communications between flight station, landing gear and tail skid areas.
- (4) Ensure that the following circuit breakers are closed and tagged:

- (a) Flight Engineer/Second Officers CB2 circuit breaker panel:

GEAR CONT NO. 1 (F17)

GEAR CONT NO. 2 (F18)

IND LT F/E PANEL LOWER (J4)

IND LT F/E PANEL UPPER (J3)

IND LT PILOTS (J2)

MLG GND SENSE (L8)

TRUCK LEVEL (F16)

F/E IND LT TEST 1 (H1)

F/E IND LT TEST 2 (H2)

F/E IND LT TEST 3 (H3)

F/E IND LT TEST 4 (H4)

F/E IND LT TEST 5 (H5)

PILOTS IND LT TEST 1 (H8)

PILOTS IND LT TEST 2 (H9)

PILOTS IND LT TEST 3 (H10)

TAIL SKID CONT (F12)

TAIL SKID IND (F13)

LOCKHEED
MAINTENANCE MANUAL

(b) Pilots overhead CB1 circuit breaker panel:

PROX SW PWR NO. 1 (L10)

PROX SW PWR NO. 4 (L11)

DOOR POSN IND (L13)

- (5) Perform BITE test of proximity switch card box and proximity logic box (Ref. 31-22-00).**
- (6) Perform indicator lights test using WARN/CAUTION/ADVISORY LIGHTS TEST switch on Pilots overhead panel and Flight Engineer/Second Officers panel (Ref. 33-17-00).**

NOTE: An artificial target is a sheet of 4130 steel, 0.050-inch thick with a 6-foot streamer attached, slightly larger than the sensor face. To place an artificial target on a sensor, a plastic spacer the thickness of the required gap is placed between the artificial target and the sensor. To shade a target, a 0.050-inch thick sheet of aluminum with a 6-foot streamer attached, is positioned between the sensor and its related target while the target is adjacent to the sensor. An artificial target which clips onto the sensor may be locally fabricated (Ref. Fig. 501).

- (7) Test NLG forward doors sensors and targets (Ref. Table 501).**
- (8) Test NLG uplock and downlock sensors and targets (Ref. Table 502).**
- (9) Test MLG doors sensors and targets (Ref. Table 503).**
- (10) Test MLG downlock sensors and targets, and up position sensors (Ref. Table 504).**
- (11) Test tail skid sensors (Ref. Table 505).**
- (12) Test truck position sensors and targets (Ref. Table 506).**
- (13) Turn off electrical power (Ref. 24-00-00).**
- (14) Remove tags from circuit breakers called out in Steps 4A(4)(a) and 4A(4)(b).**

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EFFECTIVITY: ALL

32-61-00
Page 503
May 15/86

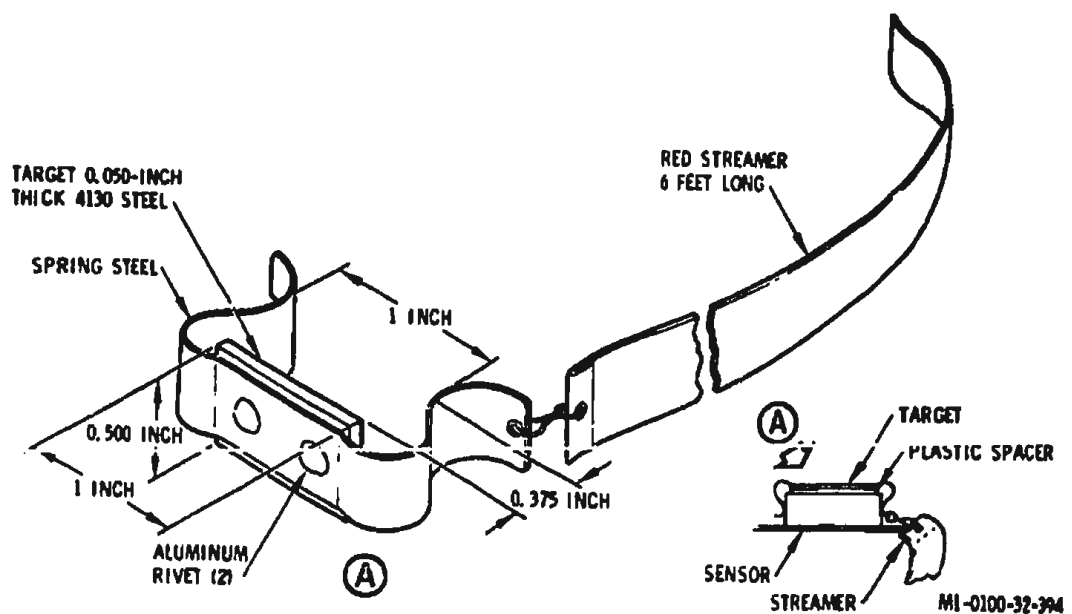


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CAUTION: INADVERTENTLY LEAVING THE ARTIFICIAL TARGET IN THE SYSTEM AFTER THE TEST MAY POSE OPERATIONAL AND SAFETY HAZARDS.

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(15) Verify all artificial targets, spacers and shades are removed from sensors following tests.



Position Indicating Sensor Artificial Target
Figure 501.

EFFECTIVITY: ALL

001B

LOCKHEED
MAINTENANCE MANUAL

NLG Forward Doors Sensors and Targets Test
Table 501

CONDITION	ACTION	INDICATION
R Landing gear down and locked, control lever DOWN, MLG inboard doors closed, NLG forward doors closed, tail skid extended.	None	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR lights are on (Ref. Fig. 502).
R Same	Open left NLG forward door.	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR DOOR IN TRANS lights are on. F/E S/O panel - NOSE GEAR DOOR light is on.
Same	Open right NLG forward door and close left NLG forward door.	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR DOOR IN TRANS lights are on. F/E S/O panel - NOSE GEAR DOOR light is on.
Same	Close right NLG forward door	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR lights are on.

OBSERVE
PRECAUTIONS CALLED
OUT IN WARNING
(SEE NOTE 1).

EFFECTIVITY: ALL

022B

32-61-00
Page 505
Feb 15/79

LOCKHEED
MAINTENANCE MANUAL

NLG Forward Doors Sensors and Targets Test (Cont)
Table 501

CONDITION		ACTION	INDICATION
R R	Landing gear down and locked, control lever NEUTRAL, MLG inboard doors closed, tail skid is extended.	Place artificial targets with 0.125-inch plastic spacers on MLG up position sensors. Place artificial target with 0.220-inch plastic spacer on NLG uplock sensor. Shade NLG downlock sensor. Shade MLG downlock sensors.	F/E S/O panel - TAIL SKID light is on.
R	Same	Open left NLG forward door.	Pilots inst. panel - DOOR IN TRANS lights are on. F/E S/O panel - NOSE GEAR DOOR TAIL SKID light is on.
	Same	Open right NLG forward door. Close left NLG forward door	Pilots inst. panel - DOOR IN TRANS lights are on. F/E S/O panel - NOSE GEAR DOOR TAIL SKID light is on.
R R R	Same	Close right NLG door.	FE/SO panel - TAIL SKID light is on.
	Same	Place control lever in DOWN position. Remove artificial targets and plastic spacers from MLG up position sensors. Remove shades from MLG downlock sensors. Remove artificial target and plastic spacer from NLG uplock sensor. Remove shade from NLG downlock sensor.	

EFFECTIVITY: ALL

0228

32-61-00
Page 506
Feb 15/79

LOCKHEED
MAINTENANCE MANUAL

NLG Forward Doors Sensors and Targets Test (Cont)
Table 501

CONDITION	ACTION	INDICATION
R Landing gear down and locked, R control lever R DOWN, MLG inboard doors closed, NLG forward doors closed, tail skid is extended.	None	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR lights are on.

NOTE 1:

WARNING: ENSURE THAT HYDRAULIC SYSTEM C PRESSURE IS 0 PSI
AND LANDING GEAR DOWNLOCK SAFETY PINS ARE
INSTALLED BEFORE LANDING GEAR CONTROL LEVER IS
PLACED IN THE NEUTRAL POSITION.

EFFECTIVITY: ALL

32-61-00
Page 507
Feb 15/79

0228

LOCKHEED



MAINTENANCE MANUAL

NLG Uplock and Downlock Sensors and Targets Test Table 502

CONDITION	ACTION	INDICATION
Landing gear down and locked, control lever DOWN, MLG inboard doors closed, NLG forward doors closed, tail skid is extended.	None	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR lights are on (Ref. Fig. 502).
Same	Shade NLG downlock sensor (Ref. Fig. 503).	Pilots inst. panel - RIGHT GEAR LEFT GEAR IN TRANS lights are on.
Same	Leave shade on NLG downlock sensor. Place artificial target with 0.220-inch plastic spacer on NLG uplock sensor.	Pilots inst. panel - RIGHT GEAR LEFT GEAR IN TRANS lights are on.
Same	Leave artificial target with plastic spacer on NLG uplock sensor. Remove shade from NLG downlock sensor.	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR IN TRANS lights are on.
Same	Remove artificial target and plastic spacer from NLG uplock sensor.	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR lights are on.

OBSERVE
PRECAUTIONS CALLED
OUT IN WARNING
(SEE NOTE 1).

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0228

EFFECTIVITY: ALL

32-61-00

Page 508
Feb 15/79



MAINTENANCE MANUAL

NLG Uplock and Downlock Sensors and Targets Test (Cont)
Table 502

CONDITION	ACTION	INDICATION
Landing gear down and locked control lever NEUTRAL, MLG inboard doors closed, tail skid is extended.	Place artificial targets with 0.125-inch plastic spacers on MLG up position sensors. Shade MLG downlock sensors.	Pilots inst. panel - NOSE GEAR IN TRANS lights are on F/E S/O panel - TAIL SKID light is on.
Same	Shade NLG downlock sensor	Pilots inst. panel - IN TRANS light is on. F/E S/O panel - TAIL SKID light is on.
Same	Leave shade on NLG downlock sensor. Place artificial target with 0.220-inch plastic spacer on NLG uplock sensor.	FE/ S/O panel - TAIL SKID light is on.
Same	Remove artificial target and plastic spacer from NLG uplock sensor. Remove artificial targets and plastic spacers from MLG up position sensors. Remove shades from MLG and NLG downlock sensors.	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR IN TRANS lights are on. F/E S/O panel - TAIL SKID light is on.
Landing gear down and locked, control lever DOWN, MLG inboard doors closed, tail skid is extended.	None	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR lights are on.

NOTE 1:

WARNING: ENSURE THAT HYDRAULIC SYSTEM C PRESSURE IS 0 PSI AND LANDING GEAR DOWNLOCK SAFETY PINS ARE INSTALLED BEFORE LANDING GEAR CONTROL LEVER IS PLACED IN THE NEUTRAL POSITION.

LOCKHEED
MAINTENANCE MANUAL

R **MLG Doors Sensors and Targets Test**
Table 503

CONDITION	ACTION	INDICATION
Landing gear down and locked, control lever DOWN, MLG inboard doors closed, NLG forward doors closed, tail skid extended.	None	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR lights are on (Ref. Fig. 502).
Same	Pull D-handle to open MLG right door and install MLG door actuator lock (Ref. 32-10-00).	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR DOOR IN TRANS lights are on. F/E S/O panel - RH GEAR DOOR light is on.
Same	Place artificial target with 0.245-inch plastic spacer on right inboard door uplock sensor (Ref. Fig. 503).	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR lights are on.
Same	Pull D-handle to open MLG left door and install MLG door actuator lock (Ref. 32-10-00).	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR DOOR IN TRANS lights are on. F/E S/O panel - LH GEAR DOOR light is on.
Same	Place artificial target with 0.245-inch plastic spacer on left inboard door uplock sensor.	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR lights are on.

EFFECTIVITY: ALL

001B

32-61-00
Page 510
May 15/86



R

MLG Doors Sensors and Targets Test (Cont)
Table 503

CONDITION	ACTION	INDICATION
Same.	Remove artificial targets and plastic spacers from both inboard door uplock sensors.	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR DOOR IN TRANS lights are on. F/E S/O panel - RH GEAR DOOR lights are on.
Same	Ensure that system C hydraulic pressure is 0 psi. Remove MLG inboard door actuator locks and stow both MLG door D-handles (Ref. 32-33-00).	

EFFECTIVITY: ALL

001B



MLG Downlock and Up Position Sensors and Targets Test Table 504

	CONDITION	ACTION	INDICATION
R	Landing gear down and locked, control lever DOWN, MLG inboard doors closed, NLG forward doors closed.	None	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR lights are on (Ref. Fig. 502).
	Same	Pull both D-handles to open both MLG inboard doors and install MLG door actuator locks on both doors (Ref. 32-33-00).	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR DOOR IN TRANS F/E S/O panel - RH GEAR DOOR LH GEAR DOOR lights are on.
R	Same	Place artificial targets with 0.125-inch plastic spacers on both MLG door uplock sensors (Ref. Fig. 503).	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR lights are on.
R R R R R R R R R R R R R R R R R R R R R R	Same	Place artificial target with 0.125-inch plastic spacer on left MLG up position sensor, right MLG up position sensor, and NLG uplock sensor. Shade left MLG downlock sensor, right MLG downlock sensor, and NLG downlock sensor.	Pilots inst. panel - NOSE GEAR LEFT GEAR RIGHT GEAR lights are off. IN TRANS light is on.
R R R R R R R R R R R R R R R R R R R R R R	WARNING: ENSURE THAT HYDRAULIC SYSTEM C PRESSURE IS 0 PSI AND LANDING GEAR DOWNLOCK SAFETY PINS AND NOSE FUSELAGE JACK ARE INSTALLED BEFORE LANDING GEAR CONTROL LEVER IS MOVED FROM THE DOWN POSITION.		

EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL

MLG Downlock and Up Position Sensors and Targets Test (Cont)
Table 504

CONDITION	ACTION	INDICATION
Landing gear down and locked, control lever NEUTRAL, NLG forward doors closed.	Place landing gear control lever in neutral position.	Pilots inst. panel - NOSE GEAR LEFT GEAR RIGHT GEAR IN TRANS lights are off.
Same	Place landing gear control lever in up position.	Pilots inst. panel - NOSE GEAR LEFT GEAR RIGHT GEAR IN TRANS lights are off.
Same	Place landing control lever in down position.	Pilots inst. panel - IN TRANS light is on.
Landing gear down and locked, control lever is in down position, NLG forward doors closed.	Remove artificial target and plastic spacers from left MLG up position sensor, right MLG up position sensors, and nose gear uplock sensor. Remove shades from left MLG, right MLG, and NLG downlock sensors.	Pilots inst. panels - NOSE GEAR LEFT GEAR RIGHT GEAR lights are on.
Same	Remove artificial target and plastic spacer from MLG door uplock sensors. Remove MLG inboard door actuator locks.	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR DOOR IN TRANS lights are on.
WARNING: VERIFY THAT LANDING GEAR DOWNLOCK SAFETY PINS ARE INSTALLED. ENSURE THAT ALL FLIGHT CONTROL SURFACES AND MLG DOOR AREAS ARE CLEAR OF PERSONNEL AND EQUIPMENT. ENSURE THAT HYDRAULIC SYSTEM C CAN ACCEPT HYDRAULIC PRESSURE.		

EFFECTIVITY: ALL

001B

32-61-00
Page 513
May 15/86

LOCKHEED



MAINTENANCE MANUAL

R MLG Downlock and Up Position Sensors and Targets Test (Cont)
R Table 504
R -----

R	CONDITION	ACTION	INDICATION
R	-----	-----	-----
R	Same	Pressurize hydraulic	Pilots inst. panel -
R		system C. Ensure MLG	NOSE GEAR
R		door areas are clear,	LEFT GEAR
R		stow MLG door D-handles	RIGHT GEAR
R		(Ref. 32-33-00).	lights are on.
R	-----	-----	-----

EFFECTIVITY: ALL

001B

32-61-00

Page 514
May 15/86

LOCKHEED
MAINTENANCE MANUAL

Tail Skid Position Sensors Test
Table 505

CONDITION	ACTION	INDICATION
OBSERVE PRECAUTIONS CALLED OUT IN WARNING (SEE NOTE 1).		
Landing gear down and locked, control lever DOWN, MLG inboard doors closed, NLG forward doors closed, tail skid extended.	None	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR lights are on (Ref. Fig. 502).
Same	Turn on hydraulic system A pressure (Ref. 29-11-00).	
OBSERVE PRECAUTIONS CALLED OUT IN WARNING (SEE NOTE 2).		
R Landing gear down R and locked, R inboard doors R closed, NLG R forward doors R closed. R	Place landing gear control lever to the UP position.	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR IN TRANS lights are on. FE/SO panel - TAIL SKID light comes on, then goes off when tail skid is fully retracted.

EFFECTIVITY: ALL

001B

32-61-00
Page 515
May 15/82

LOCKHEED
MAINTENANCE MANUAL

Tail Skid Position Sensors Test (Cont)
Table 505

CONDITION	ACTION	INDICATION
Same	Place landing gear control lever to DOWN.	Pilots inst. panel - NOSE GEAR RIGHT GEAR LEFT GEAR lights are on. F/E S/O panel - TAIL SKID light comes on, then goes off when tail skid is fully extended.
Same	Turn off hydraulic system A pressure (Ref. 29-11-00).	

NOTE 1:

WARNING: VERIFY THAT LANDING GEAR DOWNLOCK SAFETY PINS ARE INSTALLED. ENSURE THAT ALL FLIGHT CONTROL SURFACES AND MLG DOOR AREAS ARE CLEAR OF PERSONNEL AND EQUIPMENT. ENSURE THAT HYDRAULIC SYSTEM A CAN ACCEPT HYDRAULIC PRESSURE.

NOTE 2:

WARNING: ENSURE THAT HYDRAULIC SYSTEM C PRESSURE IS 0 PSI AND LANDING GEAR DOWNLOCK SAFETY PINS ARE INSTALLED BEFORE LANDING GEAR CONTROL LEVER IS PLACED IN THE NEUTRAL POSITION.

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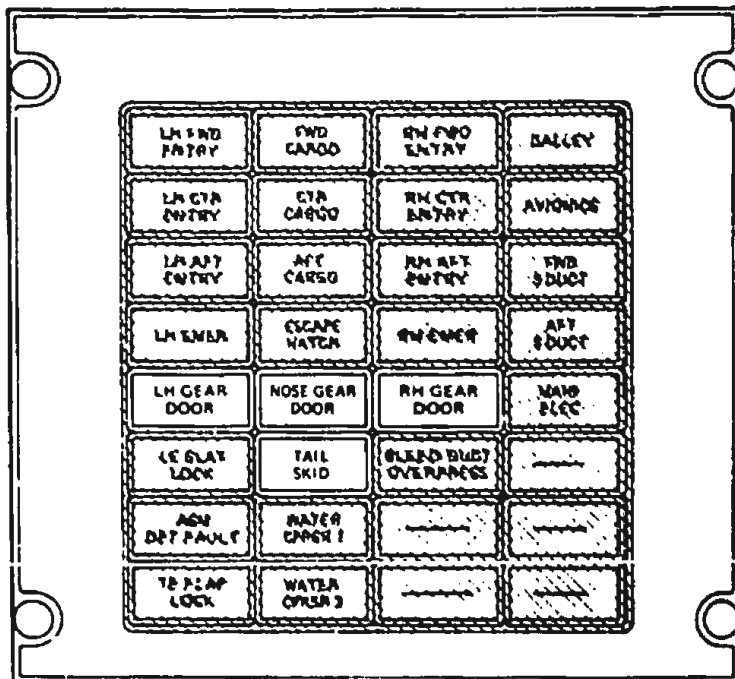
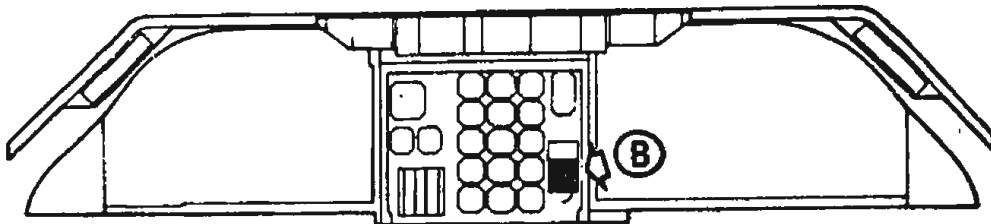
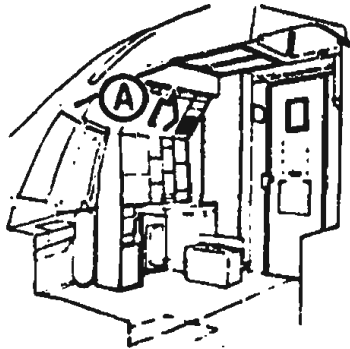


MAINTENANCE MANUAL

Truck Position Sensors Test
Table 506

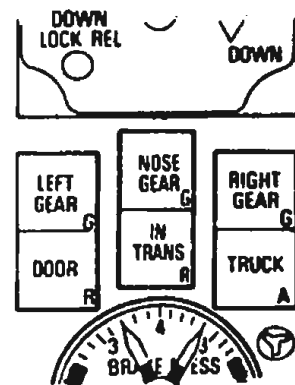
CONDITION	ACTION	INDICATION
Landing gear control lever DOWN, landing gear down and locked.	Place clinometer on truck J-box or other suitable position. Measure truck positioner length from centers of attachment pins. Measurement should be 15.85 (± 0.03) inches. Adjust length of positioner by jacking truck at the applicable axle (Ref. 7-11-00). If positioner is too short, jack at rear axle. If positioner is too long, jack at front axle. When the correct length has been achieved, read clinometer. Truck will be at right angle to strut. Continue to jack truck until TRUCK light comes on. Lower jack until the positioner length has been returned to 15.85 (± 0.03) inches. Using a second jack, raise opposite end of beam until truck light again comes on. Lower and remove jacks.	Pilots inst. panel - TRUCK light should come on at 2.5 (± 1.0) degrees tilt (Ref. Fig. 502).
		Pilots inst. panel - TRUCK light should come on at 2.5 (± 1.0) degrees tilt from right angle relationship to strut.

LOCKHEED
MAINTENANCE MANUAL



(A)

FLIGHT ENGINEER/SECOND OFFICERS PANEL



(B)

PILOTS PANEL

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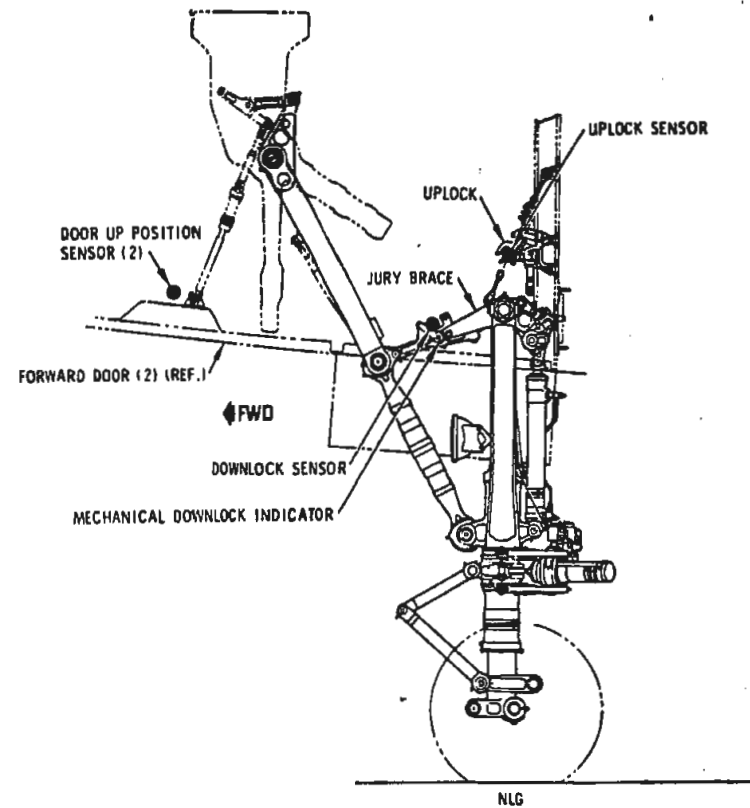
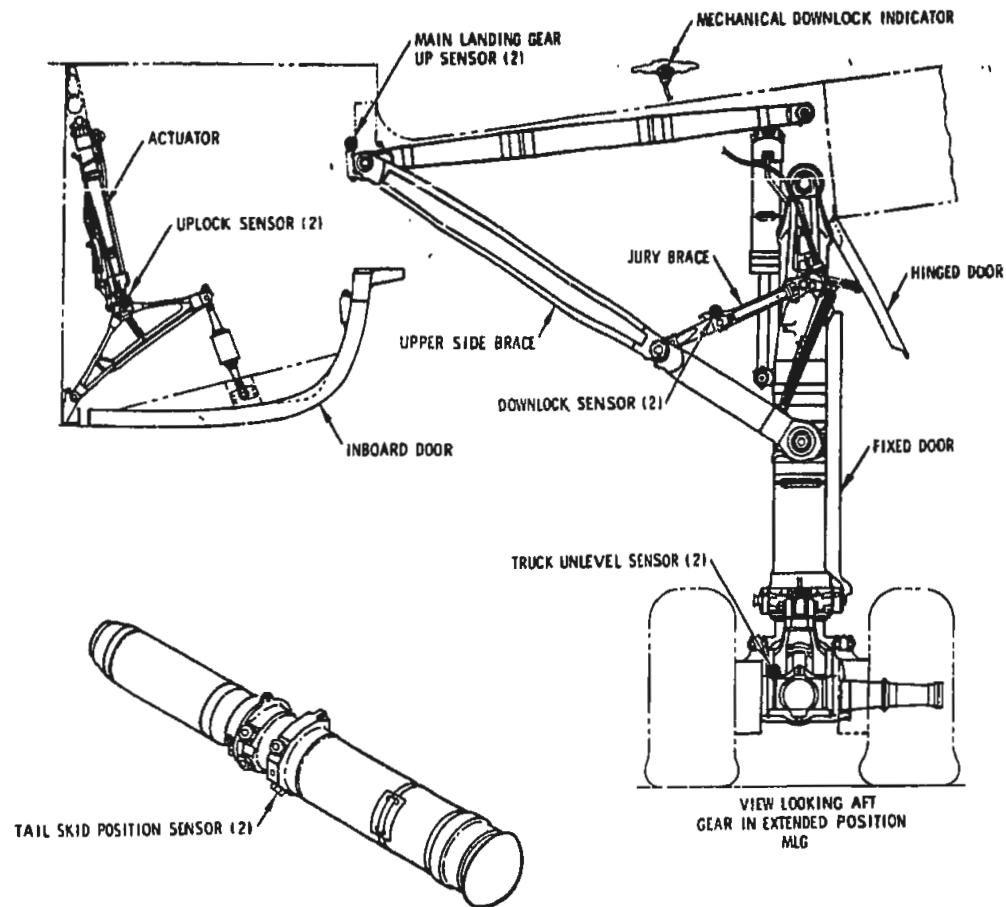
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Position Indicating and Warning System Indicator Lights
Figure 502

EFFECTIVITY: ALL

0018

32-61-00
Page 518
May 15/82



MI-0001-37 173

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Position Indicating and Warning System Sensor Locations
Figure 503

EFFECTIVITY: ALL

32-61-00
Page 519/520
Aug 15/81

001B



MAIN LANDING GEAR UP POSITION SENSOR -- REMOVAL AND INSTALLATION

1. Equipment and Materials

Lock-wire, QQ-W-390, 0.040-inch diameter, inconel, condition A, or equivalent

2. Referenced Procedures

32-10-00 Main Landing Gear Inboard Door - Maintenance Practices

32-61-02 Main Landing Gear Up Position Sensor - Adjustment and Test

3. Removal/Installation

A. Removal

- (1) On pilots overhead circuit breaker panel CB1, open and tag PROX SW PWR NO. 1 (L10), PROX SW PWR NO. 4 (L11) and WARN HGRN (L12) circuit breakers.
- (2) Open main landing gear (MLG) inboard door, and install MLG inboard door actuator lock (Ref. 32-10-00).
- (3) At terminal module, remove red and blue sensor leads (Ref. Fig. 401). Mark terminal module connections for installation.
- (4) At grounding post, disconnect yellow sensor lead.
- (5) Secure pull-wire to red, blue, and yellow sensor leads.
- (6) Remove bolts securing sensor to mounting bracket.
- (7) Disconnect conduit nut from sensor.
- (8) Pull sensor leads and pull-wire through conduit until sensor leads are clear of conduit.
- (9) Remove pull-wire from sensor leads, and leave pull-wire in conduit.

B. Installation

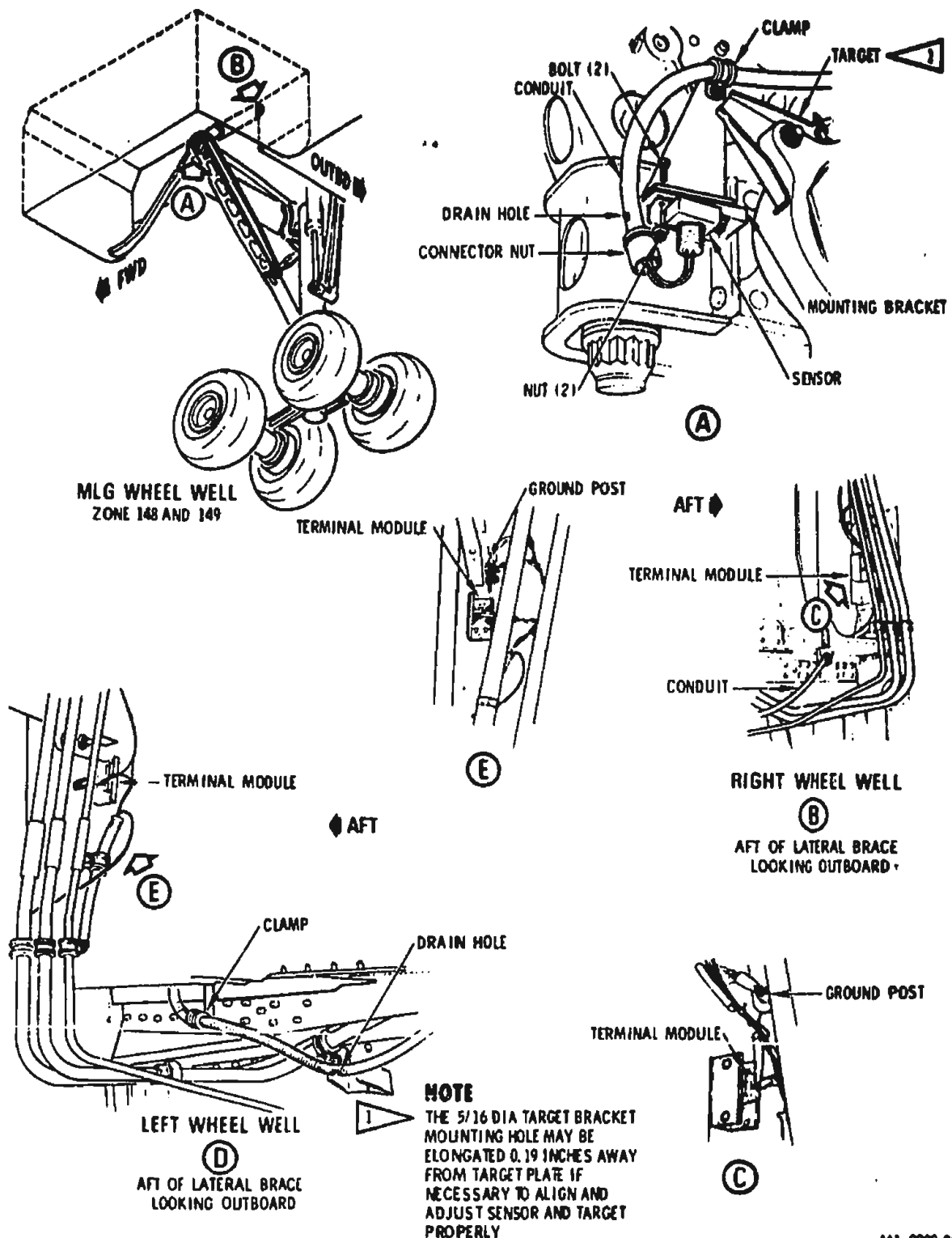
- (1) Verify that MLG inboard door actuator lock is installed.

EFFECTIVITY: ALL



- (2) Verify that circuit breakers opened in Step 3A(1) are open and tagged.
- (3) Ensure that drain holes in conduit are not clogged.
- (4) Secure sensor leads to pull-wire.
- (5) Pull sensor leads through conduit until conduit nut is against sensor.
- (6) Secure conduit nut to sensor, and safety with lock-wire.
- (7) Secure sensor to mounting bracket.
- (8) Clamp conduit in position so that drain holes are at low points of conduit routing and holes are facing downward.
- (9) Remove pull-wire from sensor leads.
- (10) Connect red and blue sensor leads. Use terminal module markings made during removal to ensure correct connections.
- (11) Connect yellow sensor lead to grounding post.
- (12) Perform MLG up position sensor adjustment and test procedure (Ref. 32-61-02).
- (13) Remove tags and close circuit breakers opened in Step 3A(1).
- (14) Remove MLG inboard door actuator lock, and close MLG inboard door as required (Ref. 32-10-00).

LOCKHEED
MAINTENANCE MANUAL



CR Main Landing Gear Up Position Sensor - Removal and Installation
CR Figure 401

EFFECTIVITY: ALL

32-61-02
Page 403/404
May 15/85

MAIN LANDING GEAR UP POSITION SENSOR - ADJUSTMENT AND TEST1. Equipment and Materials

Straight edge, 12-inches long

Scale, 6-inches long

2. Referenced Procedures

32-10-00 Main Landing Gear Inboard Door - Maintenance Practices

32-61-00 Landing Gear Position Indicating and Warning System - Adjustment and Test

3. Adjustment/Test

A. Adjustment

- (1) Position straight edge across end of upper side brace pin so that straight edge is adjacent to sensor face (Ref. Fig. 501).

NOTE: On the right main landing gear (MLG), the straight edge is placed across the pin head. On the left MLG, the straight edge is placed across the threaded end of pin.

- (2) Use scale to measure distance from straight edge to sensor face. Note this dimension as X.
- (3) Position straight edge across end of pin so that straight edge is adjacent to target (Ref. Fig. 501).
- (4) Use scale to measure distance from straight edge to target face. Note this dimension as Y.
- (5) Subtract X-Y. Difference must be 0.125-inch $\pm$ 0.030-inch. This dimension represents gap between sensor and target.
- (6) Ensure that sensor face is parallel to target face.
- (7) Verify that target slide-by overlap of sensor face is minimum of 70 percent.

B. Test

EFFECTIVITY: ALL

001B

32-61-02
Page 501
May 15/85

LOCKHEED



MAINTENANCE MANUAL

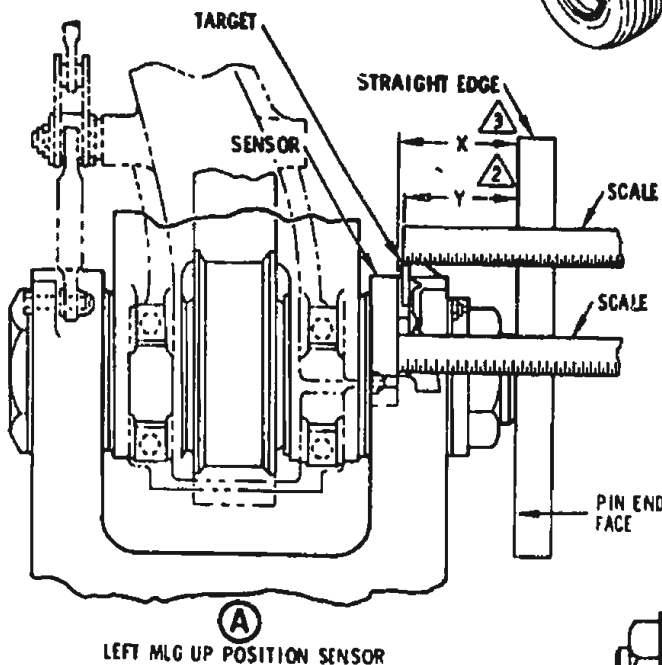
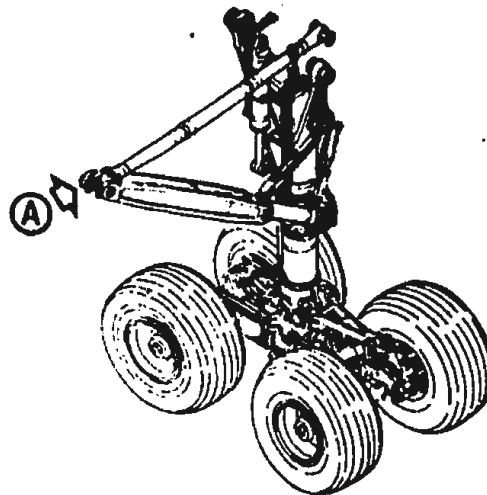
- (1) Perform position indicating and warning system adjustment and test (Ref. 32-61-00).

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32-61-02

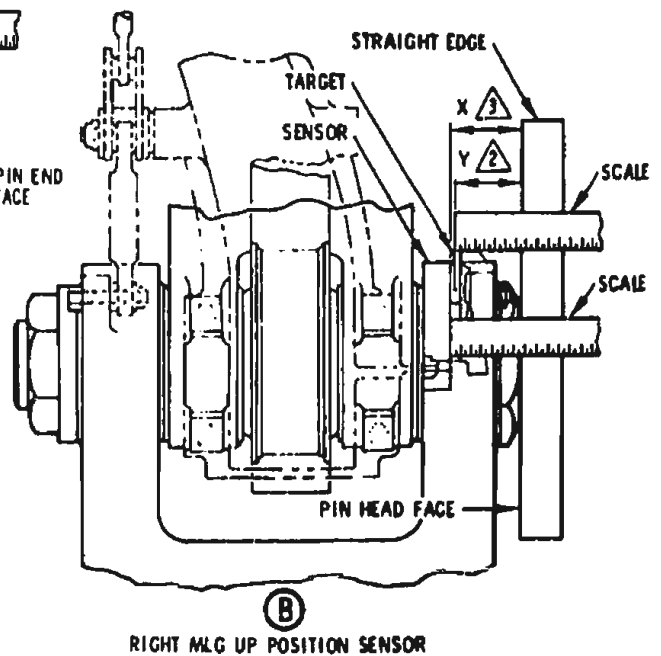
Page 502
May 15/85



LEFT MLG UP POSITION SENSOR

NOTE

- 1 SENSOR TO TARGET GAP IS DERIVED FROM X-Y AND SHOULD BE 0.125-INCH $\pm$ 0.040-INCH
- 2 Y DIMENSION MEASURED FROM TARGET FACE TO STRAIGHT EDGE
- 3 X DIMENSION MEASURED FROM SENSOR FACE TO STRAIGHT EDGE
- 4 THE 5/16 DIA TARGET BRACKET MOUNTING HOLE MAY BE ELONGATED 0.19 INCHES AWAY FROM TARGET PLATE IF NECESSARY TO ALIGN AND ADJUST SENSOR AND TARGET PROPERLY



RIGHT MLG UP POSITION SENSOR

M1-0000-32-3028

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CR

Main Landing Gear Up Position Sensor - Adjustment and Test
Figure 501

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32-61-02
Page 503/504
May 15/85

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR DOWNLOCK SENSOR - REMOVAL AND INSTALLATION

1. Equipment and Materials

Talcum powder

2. Referenced Procedures

32-10-00 Main Landing Gear Inboard Door - Maintenance Practices

32-61-03 Main Landing Gear Downlock Sensor - Adjustment and Test

3. Removal/Installation

A. Removal

- R
R
- (1) At pilots overhead circuit breaker panel CB1, zone 210, open and tag circuit breakers PROX SW PWR NO. 1 (L10), PROX SW PWR NO. 4 (L11), LANDING GEAR - DOOR POSN IND (L13) and WARN HORN (L12).
 - (2) Open applicable main landing gear (MLG) inboard door and install inboard door actuator lock (Ref. 32-10-00).
 - (3) Open MLG strut J-box; zone 731 or 741; disconnect and tag with terminal number the following wires from the center terminal strip (Ref. Fig. 401):
 - (a) Terminal 1, red wire 3261-40D
 - (b) Terminal 2, blue wire 3261-41D
 - (c) Terminal 5, yellow wire 3261-39J-N
 - (4) Remove bolts mounting sensor to jury brace.
 - (5) Loosen conduit nut and disconnect sensor from rigid conduit.
 - (6) Attach pull-wire to terminal ends of the three disconnected J-box wires for installation purposes.
 - (7) Pull wires from conduit at sensor end, while feeding pull-wire into conduit at jury box.

0018 EFFECTIVITY: ALL

32-61-03
Page 401
May 15/87



MAINTENANCE MANUAL

NOTE: If wires drag inside of conduit, it may be necessary to detach conduit from mounting clamps in order to straighten out short bends in conduit.

- R (8) When sensor wires are clear of conduit, disconnect sensor wires from pull-wire. Leave pull-wire in conduit.

B. Installation

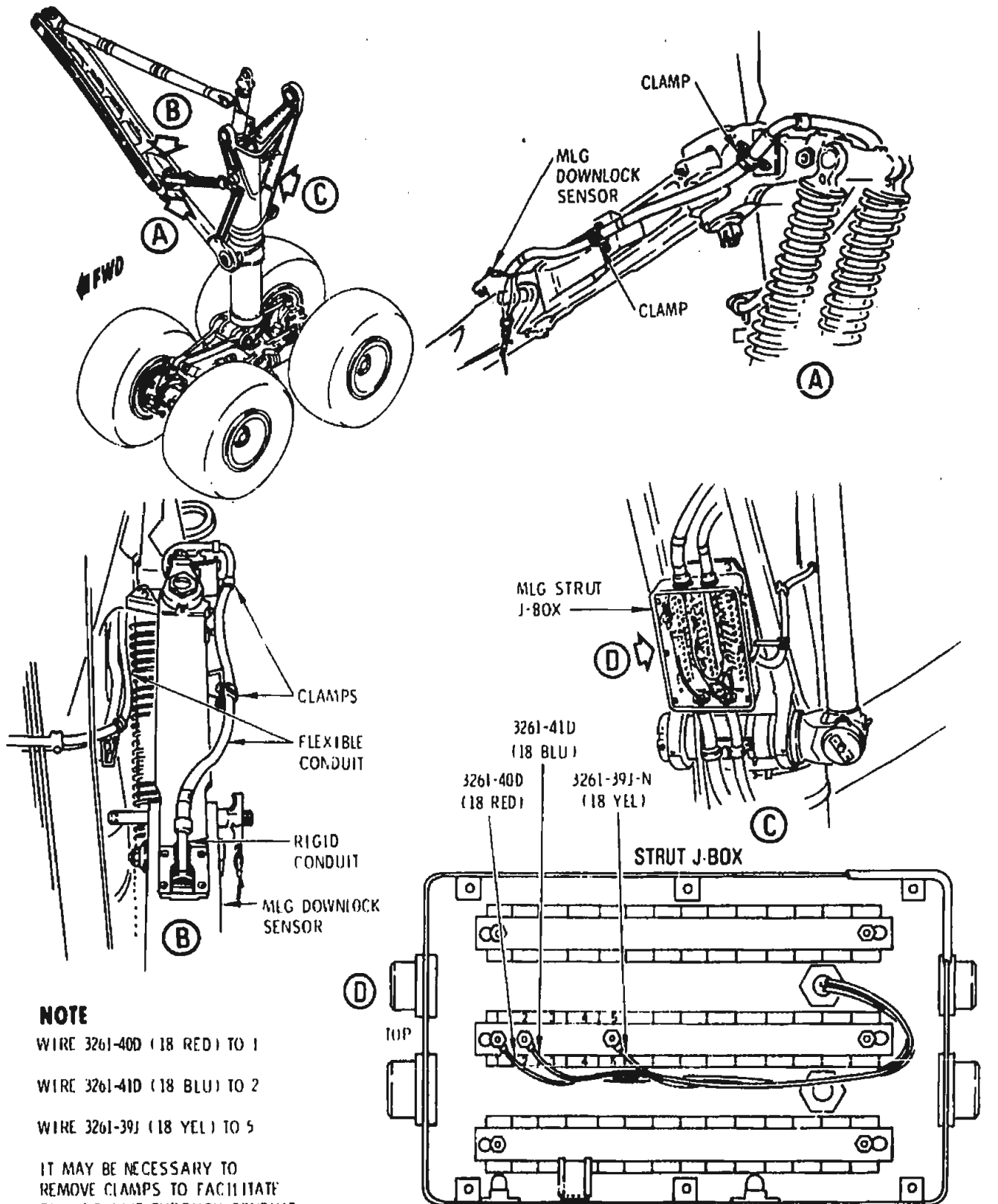
- (1) Verify that circuit breakers opened in Step 3A(1) are open and tagged.
- (2) Lubricate sensor wires with talcum powder.
- (3) Connect sensor wires to pull-wire.
- (4) Pull sensor wires through flexible conduit until rigid conduit can be connected to sensor.
- (5) Mount sensor to jury strut with bolts.
- (6) If flexible conduit was removed from mounting clamps during removal, secure conduit in place with mounting clamps.
- (7) Disconnect pull-wire from sensor wires.
- (8) Remove tags and connect sensor wires to J-box center terminal strip as follows:
 - (a) Terminal 1, red wire 3261-40D
 - (b) Terminal 2, blue wire 3261-41D
 - (c) Terminal 5, yellow wire 3261-39J-N
- (9) Remove tags and close circuit breakers opened in Step 3A(1).
- (10) Perform main landing gear downlock sensor adjustment and test (Ref. 32-61-03).
- R (11) Close MLG strut J-box.
- R (12) Close MLG inboard door (Ref. 32-10-00).

EFFECTIVITY: ALL

001B

32-61-03
Page 402
Feb 15/74

LOCKHEED
MAINTENANCE MANUAL



NOTE

WIRE 3261-40D (18 RED) TO 1

WIRE 3261-41D (18 BLU) TO 2

WIRE 3261-39J (18 YEL) TO 5

IT MAY BE NECESSARY TO
REMOVE CLAMPS TO FACILITATE
PULLING WIRE THROUGH CONDUIT

HH 8509 M1-0101-32-197

Main Landing Gear Downlock Sensor - Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-61-03
Page 403/404
May 15/73

001B

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR DOWNLOCK SENSOR - ADJUSTMENT AND TEST

C 1. Equipment and Materials

2. Referenced Procedures

- 24-00-00 External Power - Maintenance Practices
- 32-10-00 Main Landing Gear Inboard Door - Maintenance Practices
- 32-61-00 Landing Gear Position Indicating and Warning System - Adjustment and Test

3. Adjustment/Test 32-61-00).

CR A. Adjustment (Using Aircraft Indicator Lights)

NOTE: This procedure uses the aircraft RIGHT GEAR or LEFT GEAR indicator lights, located on the pilots center instrument panel, as an indicator.

- CR (1) Turn on electrical power (Ref. 24-00-00). Depressurize
CR C Hydraulic System (Ref. 29-10-00).
- (2) On pilots overhead circuit breaker panel CB1, verify that circuit breakers LANDING GEAR DOOR - POS IND (L13), PROX SW PWR NO. 1 and NO. 4 (L10, L11) are closed.
- (3) Adjust sensor-to-target gap as follows:
 - CR (a) Adjust sensor to target gap clearance to be
CR between 0.215 inches and 0.235 inches by adding or
CR subtracting shims between sensor base and mounting
CR bracket.
 - CR (b) Ensure that target covers, and is parallel to
CR sensor face.
 - CR (c) Observe applicable right or left gear green light.
CR Light should be on.
 - CR (d) Remove applicable gear pin and using locally made
CR tool (2 inches X 4 inches X 5 feet wood) move
CR applicable jury brace enough to install 0.100 inch
CR shim under jury brace stops.

EFFECTIVITY: ALL

32-61-03
Page 501
Jun 15/92

001B



MAINTENANCE MANUAL

- CR (e) Observe applicable right or left gear green light.
CR Green light must be off and red warning light on.
- CR (f) Remove shim from under jury brace stops. Observe
CR applicable gear green light is on and red warning
CR light is off.
- CR (g) Reinstall applicable gear pin if required.
- CR NOTE: Landing gear warning horn will sound when
CR red gear warning light is on.
- C (4) Alternate sensor-to-target gap adjustment procedure:
- C NOTE: If all shims are removed from the downlock
C sensor and the applicable gear green light is
C still illuminated, the following procedure may
C be used.
- C (a) Insert a 0.010 inch spacer between the jury brace
C stops. Adjust the downlock sensor so light
C remains on.
- C (b) Insert a 0.035 inch spacer between the jury brace
C stops. Light must extinguish.
- C (c) Remove shim.
- C (5) Turn off electrical power (Ref. 24-00-00).

EFFECTIVITY: ALL

001B

32-61-03
Page 502
Jun 15/92

LOCKHEED
MAINTENANCE MANUAL

NOSE LANDING GEAR UPLOCK SENSOR - REMOVAL AND INSTALLATION

1. Referenced Procedure

32-61-04 Nose Landing Gear Uplock Sensor - Adjustment and Test

2. Removal/Installation

A. Removal

- R
R
- (1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag LANDING GEAR DOOR POS IND (L13), PROX SW PWR NO. 1 (L10) and WARN HORN (L12) circuit breakers.
 - (2) In nose landing gear wheel well, remove J-box cover.
 - (3) Disconnect three wires from terminal board TB-10 (long terminal board on aircraft left side of J-box), terminal posts 3, 4, and 5 (Ref. Fig. 401).
 - (4) Cut terminal lugs from wires.
 - (5) Secure a pull-wire to sensor wires.
 - (6) Unscrew connector nut from connector.
 - (7) Unscrew connector from sensor, and slide connector free of sensor.
 - (8) Remove bolts securing sensor to uplock assembly.
 - (9) Remove shims from between sensor and uplock assembly. Save shims for installation.
 - (10) Remove sensor by pulling wires through conduit while feeding pull-wire through conduit until wires are free of conduit and can be disconnected from pull-wire. Leave pull-wire in conduit for installation.

B. Installation

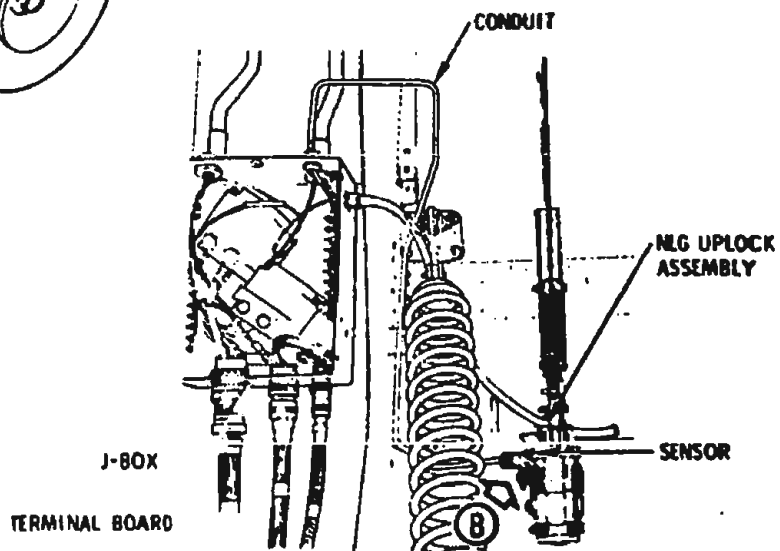
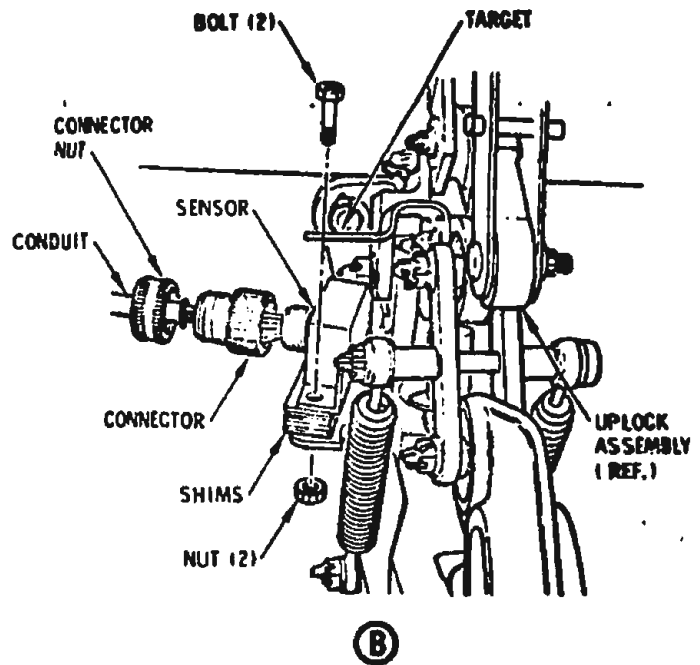
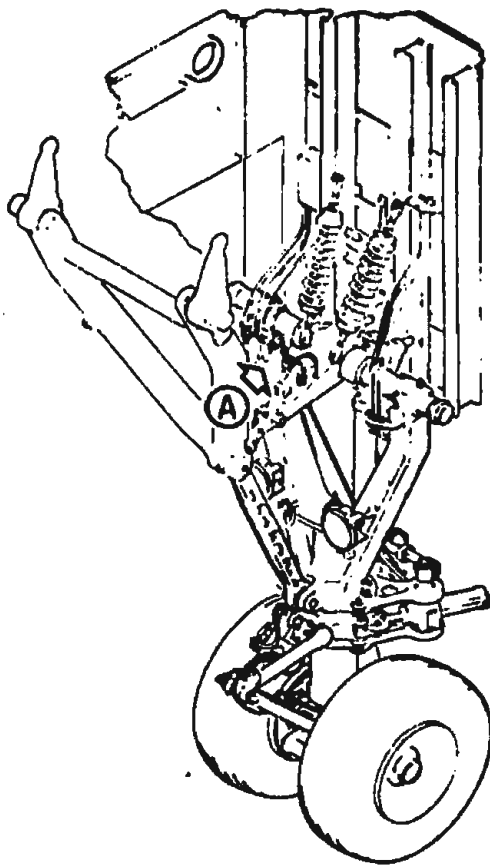
- (1) Ensure that circuit breakers opened in Step 3A(1) are open and tagged.
- (2) Secure sensor wires to pull-wire.

EFFECTIVITY: ALL

001B

32-61-04
Page 401
May 15/87

LOCKHEED
MAINTENANCE MANUAL



VIEW LOOKING AFT

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R Nose Landing Gear Uplock Sensor - Removal and Installation
R Figure 401

R EFFECTIVITY: ALL

001B

32-61-04
Page 402
May 15/73



- (3) Feed sensor wires through conduit while pulling pull-wire until sensor wires are through conduit and sensor is in contact with conduit.
 - (4) Position shims between sensor and uplock assembly. Install bolts and tighten nuts.
 - (5) Secure connector to sensor and install and tighten connector nut.
 - (6) Remove pull-wire from sensor wires, position wires adjacent to terminal posts, cut wires to correct length, and crimp terminal lugs to wires.
 - (7) Secure terminal lugs to terminal posts as follows:
- | WIRE NO. | TERMINAL POST NO. |
|---------------------|-------------------|
| 3261-21A (Blue) | 3 |
| 3261-20A (Red) | 4 |
| 3261-19C-N (Yellow) | 5 |
- (8) Install J-box cover.
 - (9) Remove tags and close circuit breakers opened in Step 3A(1).
 - (10) Adjust sensor-to-target gap (Ref. 32-61-04).

NOSE LANDING GEAR UNLOCK SENSOR - ADJUSTMENT AND TEST**1. Equipment and Materials**

Shim 0.060 (± 0.002)-inch, 1-inch wide, 3-inches long, or equivalent

Shim 0.020-inch thick, Lockheed Part No. 728807-101, or equivalent

2. Referenced Procedures

24-00-00 Electrical Power - Maintenance Practices

29-11-00 Hydraulic Power System - Maintenance Practices

31-22-00 Proximity Switch Card Box and Proximity Logic Box - Maintenance Practices

33-17-00 Indicator Lights Test - Maintenance Practices

3. Adjustment/Test**A. Preliminary Adjustment**

- (1) Ensure that hydraulic system C pressure is 0 psi and reservoir is depressurized (Ref. 29-11-00).
- (2) Manually position nose landing gear unlock hook to locked position.
- (3) Ensure that hook is in fully locked position, and overcenter link is against stop.
- (4) Adjust sensor, by inserting or removing shims, so that gap between sensor and target is approximately 0.150 inch (Ref. Fig. 501). Ensure that target surface is parallel to sensor surface. This is a preliminary adjustment and is not to be considered as final. Final adjustment is accomplished in Steps 3B(6) through 3B(8).

B. Test and Final Adjustment

NOTE: This test is to be performed with the LANDING GEAR lever in the DOWN position with all landing gears down and locked.

EFFECTIVITY: ALL

32-61-04

Page 501
Aug 15/82

LOCKHEED
MAINTENANCE MANUAL

- (1) Ensure that electrical power is on (Ref. 24-00-00).
- (2) Ensure that the following circuit breakers are closed and tagged:
 - (a) Flight Engineer/Second Officers CB2 circuit breaker panel, zone 215:

IND LT PILOTS (J2)
PILOTS IND LT TEST 1 (H8)
PILOTS IND LY TEST 2 (H9)
PILOTS IND LT TEST 3 (H10)

- (b) Pilots overhead CB1 circuit breaker panel, zone 210:

PROX SW PWR NO. 1 (L10)
PROX SW PWR NO. 4 (L11)
DOOR POSN IND (L13)

- (3) Perform BITE test of proximity switch card box and proximity logic box (Ref. 31-22-00).
- (4) Perform indicator lights test using WARN/CAUTION/ADVISORY LIGHTS TEST switch on pilots overhead panel, zone 210.
- (5) Verify that all landing gear doors are closed or have artificial targets installed to indicate landing gear doors are closed.

NOTE: An artificial target is a sheet of 4130 steel, 0.050-inch thick with a 6-foot streamer attached, slightly larger than the sensor face. To place an artificial target on a sensor, a plastic spacer the thickness of the required gap is placed between the artificial target and the sensor. An artificial target which clips onto the sensor may be locally fabricated (Ref. Fig. 502).

- (6) On pilots center instrument panel, zone 210, IN TRANS indicator light should be on.
 - (7) If IN TRANS light is not on, reduce gap between sensor and target by adding 0.020-inch thick shims one at a

EFFECTIVITY: ALL

32-61-04
Page 502
Aug 15/82

LOCKHEED



MAINTENANCE MANUAL

- R time until light comes on. Gap between sensor and
R target must not be less than 0.125 inch.
- R (8) Manually position uplock hook to unlocked position. IN
R TRANS light should go off.
- R (9) Remove artificial targets installed in Step 3B(5).
- R (10) Turn off electrical power (Ref. 24-00-00).
- R (11) Remove tags from circuit breakers called out in Step
R 3B(2).

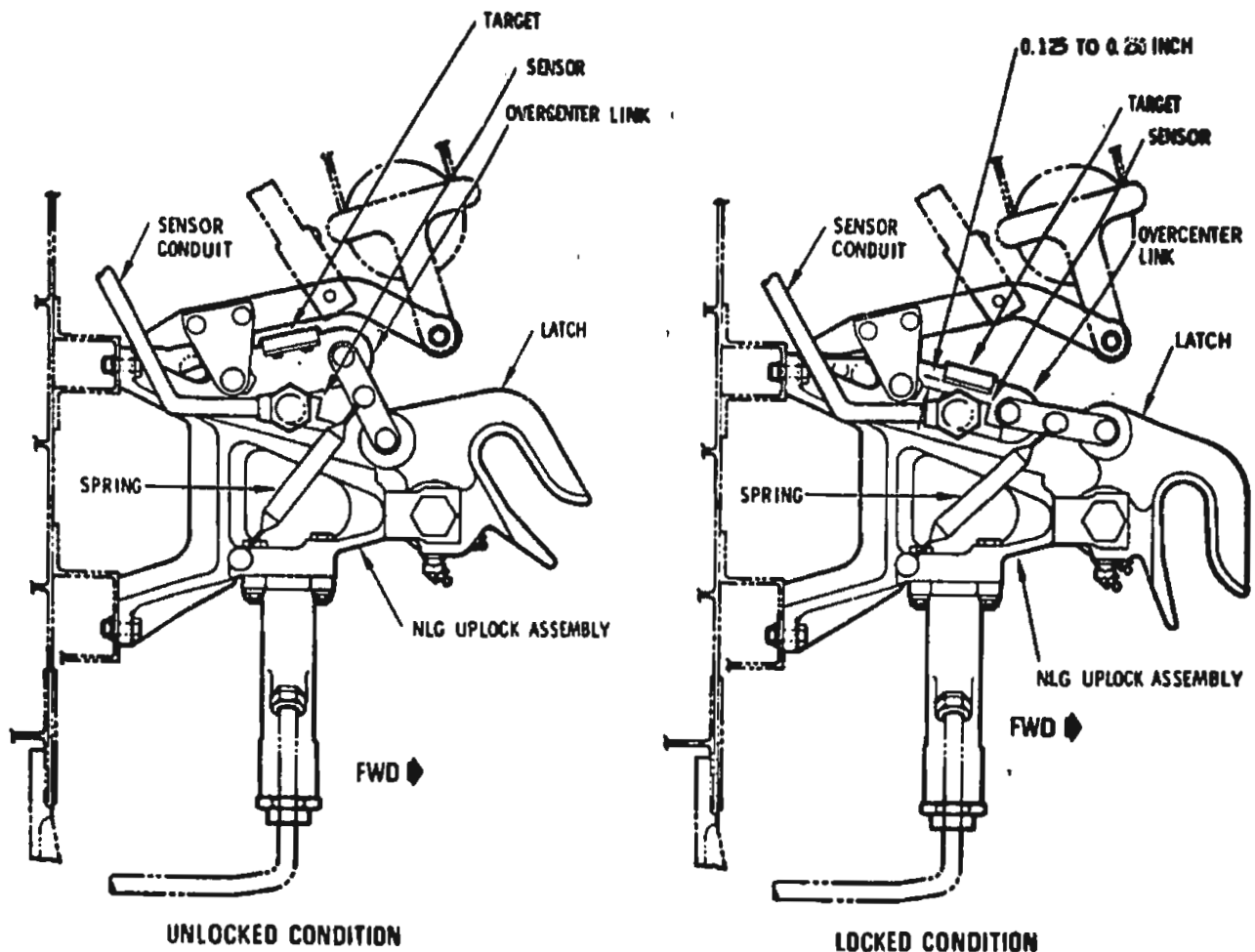
EFFECTIVITY: ALL

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32-61-04

Page 503
Aug 15/82

LOCKHEED
MAINTENANCE MANUAL



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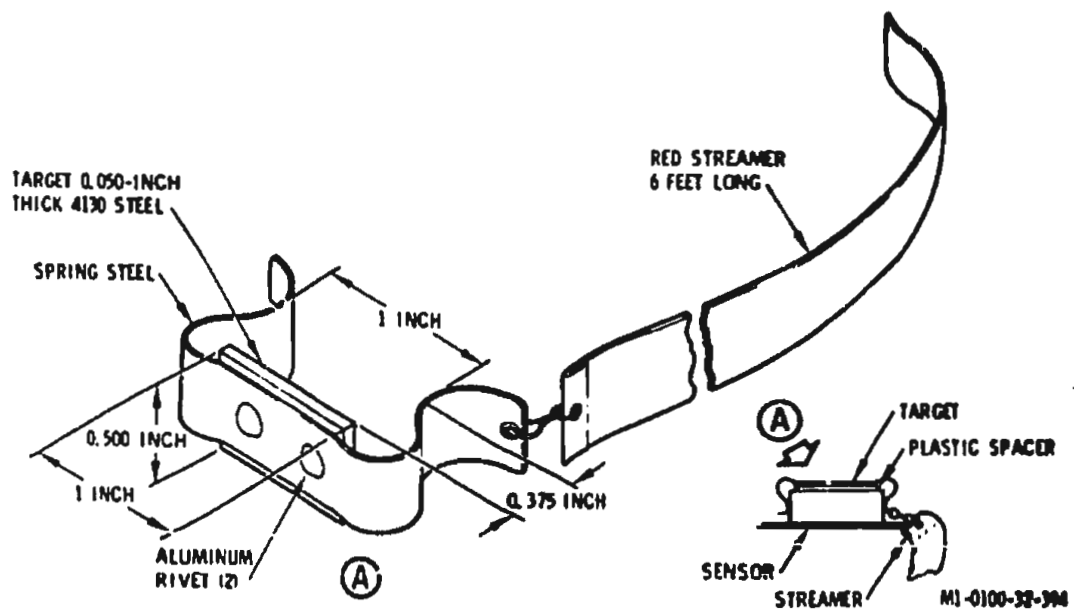
Nose Landing Gear Uplock Sensor - Adjustment and Test
Figure 501

EFFECTIVITY: ALL

0018

32-61-04
Page 504
Aug 15/82

LOCKHEED
MAINTENANCE MANUAL



Position Indicating Sensor Artificial Target
Figure 502

EFFECTIVITY: ALL

32-61-04
Page 505/506
Aug 15/82

R
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0018

LOCKHEED
MAINTENANCE MANUAL

NOSE LANDING GEAR DOWNLOCK SENSOR - REMOVAL AND INSTALLATION

1. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.042-inch diameter, or equivalent

Lock-wire, Fed Spec QQ-W-390, 0.025-inch diameter, or equivalent

2. Referenced Procedures

20-21-00 Assembly and Maintenance of Electrical Connectors -
 Wiring Diagram Manual

32-61-05 Nose Landing Gear Downlock Sensor - Adjustment and
 Test

3. Removal/Installation

A. Removal

R
R

- (1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag LANDING GEAR DOOR POS IND (L13), PROX SW PWR NO. 1 (L10) and WARN HORN (L12) circuit breakers.
- (2) Remove clamps securing conduit to nose landing gear to trunnion tube and jury brace (Ref. Fig. 401) and mark for position.
- (3) Disconnect electrical connector at J-box.
- (4) Disconnect sensor wires from connector (Ref. 20-21-00 WDM) and secure pull-wire, longer than conduit, to sensor wires.
- (5) Loosen rigid conduit B-nut and disconnect rigid conduit from sensor.
- (6) Remove nuts and remove sensor from jury brace.
- (7) Pull sensor wires out of conduit while pulling pull-wire into conduit.
- (8) Disconnect sensor wires from pull-wire.
- (9) Remove sensor.

B. Installation

EFFECTIVITY: ALL

001B

32-61-05
Page 401
May 15/87

LOCKHEED



MAINTENANCE MANUAL

- (1) Ensure that circuit breakers opened in Step 3A(1) are open.
- (2) Connect pull-wire to sensor wires and pull sensor wires through conduit until sensor is snug against rigid conduit.
- (3) Connect rigid conduit to sensor and tighten B-nut.
- (4) Connect sensor wires to electrical connector as follows (Ref. 20-21-00 WDM):
 - (a) Red wire to pin 1.
 - (b) Blue wire to pin 2.
 - (c) Yellow wire to pin 3.
- (5) Connect electrical connector to J-box.
- (6) Install sensor on jury brace but do not tighten nuts.
- (7) Position conduit, using marks made in Step 3A(2), and secure in place with clamps.
- (8) Safety sensor B-nut with 0.042-inch diameter lock-wire.
- (9) Safety electrical connector with 0.025-inch diameter lockwire.
- (10) Adjust sensor gap (Ref. 32-61-05).
- (11) Verify that nuts securing sensor to jury brace are tight.

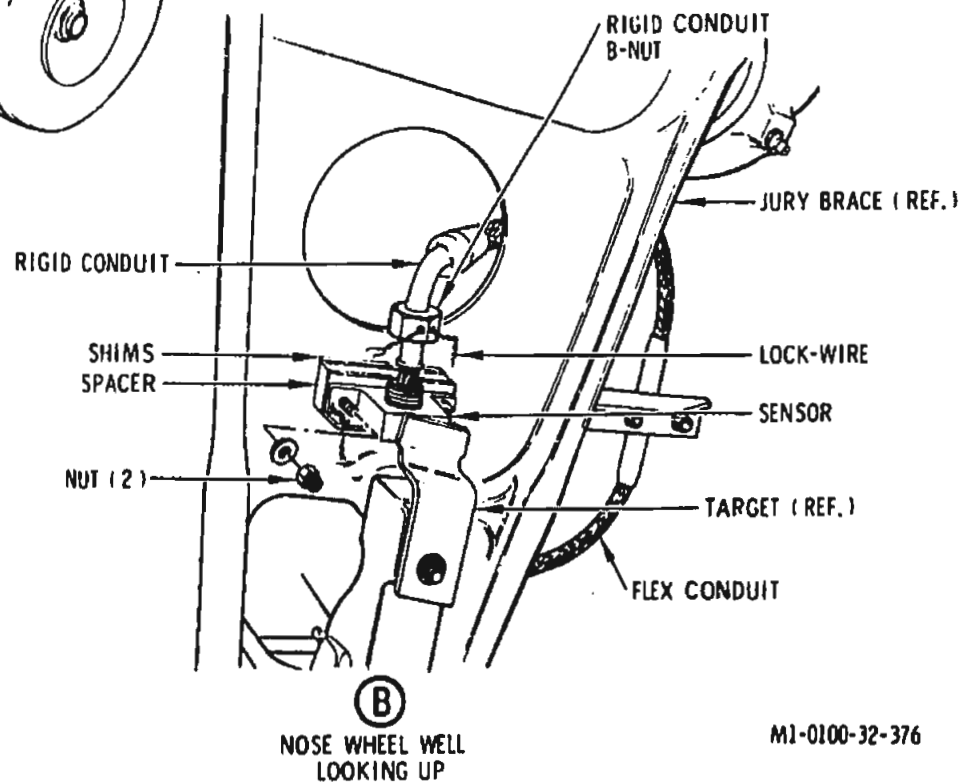
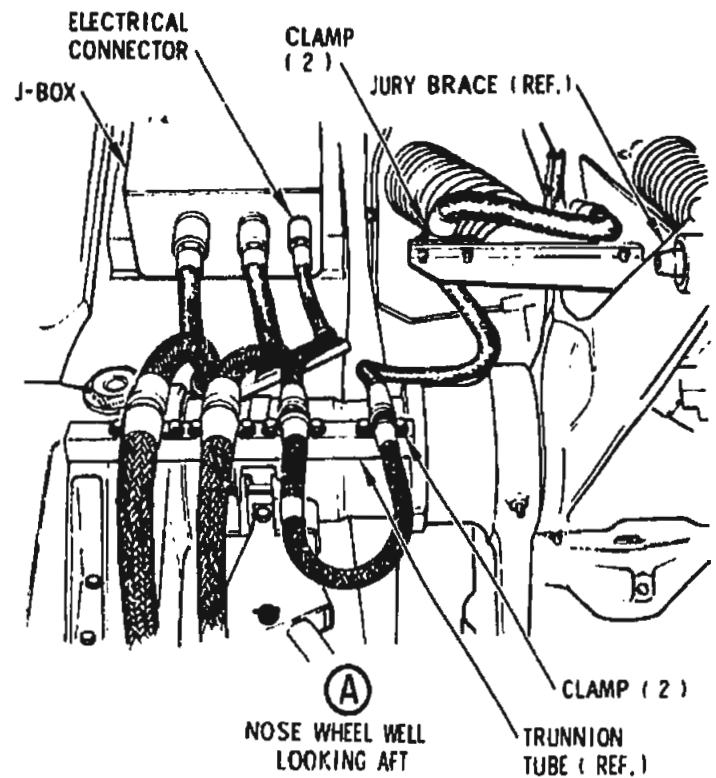
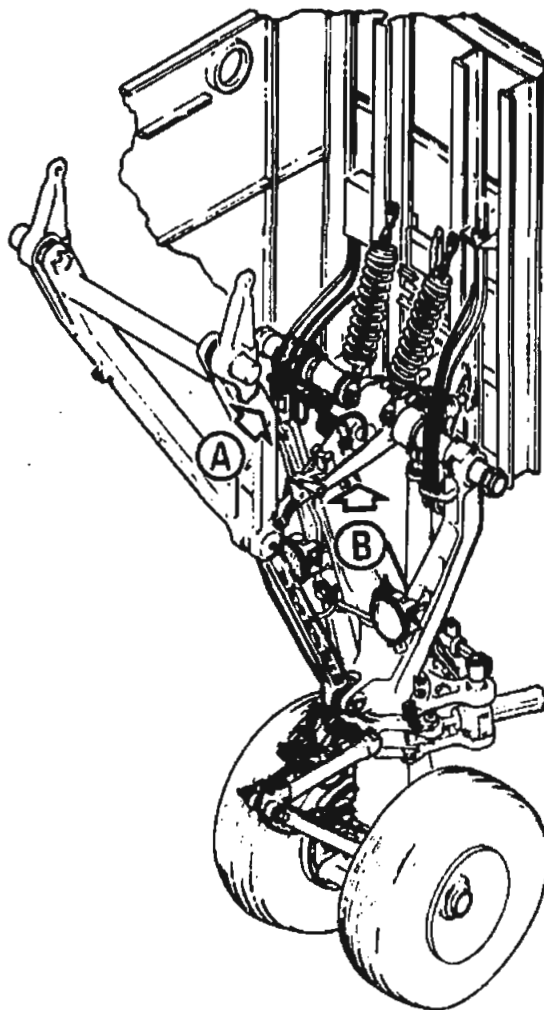
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EFFECTIVITY: ALL

001B

32-61-05
Page 402
Sep 15/79

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-376

Nose Landing Gear Downlock Sensor - Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-61-05
Page 403/404
May 15/73

001B

LOCKHEED



MAINTENANCE MANUAL

NOSE LANDING GEAR DOWNLOCK SENSOR - ADJUSTMENT AND TEST

1. Referenced Procedure

32-61-00 Landing Gear Position Indicating and Warning System
 - Adjustment and Test

2. Adjustment/Test

A. Adjustment

- (1) Check gap between sensor and target. Gap should be 0.125 to 0.250 inch.
- (2) If gap is not within tolerance, add or remove shims between sensor and spacer until gap is correct.
- (3) Ensure that target covers, and is parallel to, sensor face.
- (4) Perform sensor circuit test (Ref. 32-61-00 Page 508).

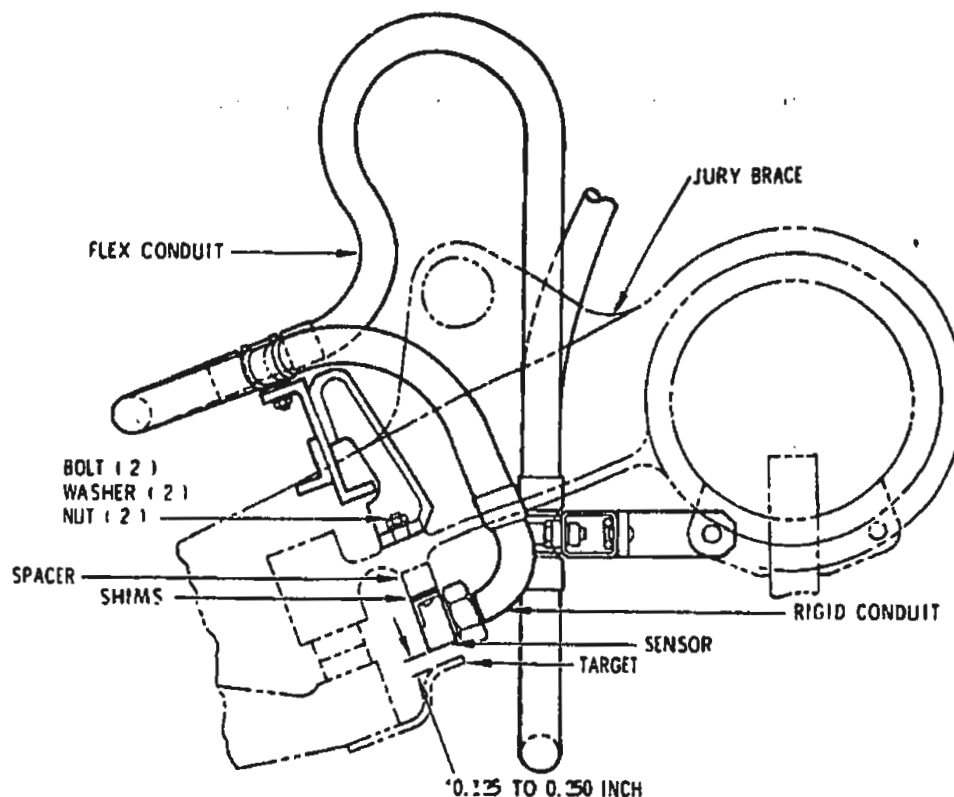
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EFFECTIVITY: ALL

32-61-05
Page 501
Jul 15/83

001B

LOCKHEED
MAINTENANCE MANUAL



M1-0001-32-377

Nose Landing Gear Downlock Sensor - Adjustment and Test
Figure 501

EFFECTIVITY: ALL

32-61-05
Page 502
May 15/82

001B

LOCKHEED
MAINTENANCE MANUAL

NOSE LANDING GEAR DOOR UP POSITION SENSOR
REMOVAL AND INSTALLATION

1. Referenced Procedure

**32-61-06 Nose Landing Gear Door Up Position Sensor -
Adjustment and Test**

2. Removal/Installation

A. Removal

R
R

- (1) At pilots overhead circuit breaker panel CB1, open and tag PROX SW PWR NO. 1 (L10) and WARN HORN (L12) circuit breakers .
- (2) Open applicable environmental control system (ECS) compartment 118CR (right side) or 117AL (left side) door (Ref. Fig. 401).
- (3) Disconnect applicable sensor leads from terminal modules as follows:

LOCATION	TERMINAL MODULE	LEAD WIRE NUMBER
Right Side	TB801-13-B	3261-77A-N (Yellow)
	TB801-14-B	3261-75A (Blue)
	TB801-15-B	3261-74A (Red)
Left Side	TB811-13-B	3261-50A-N (Yellow)
	TB811-11-B	3261-72A (Red)
	TB811-12-B	3261-64A (Blue)

- (4) Free sensor leads of all clamps, ties, and sleeves that may prevent lead wires from passing through conduit.
- (5) Secure pull-wire to ends of sensor leads.
- (6) Open applicable nose landing gear (NLG) door.
- (7) Loosen and unscrew conduit lock nut from conduit nut.
- (8) Unscrew conduit nut from sensor.
- (9) Remove mounting bolts securing sensor to mounting bracket.

EFFECTIVITY: ALL

001B

32-61-06
Page 401
May 15/87



MAINTENANCE MANUAL

- (10) Pull sensor leads and pull-wire through conduit until sensor leads are clear of conduit and pull-wire is inserted in conduit.
- (11) Disconnect sensor leads from pull-wire.

B. Installation

- (1) Ensure that circuit breakers opened in Step 2A(1) are open and tagged.
- (2) Secure sensor leads to pull-wire.
- (3) Pull sensor leads through conduit until conduit nut is up against sensor.
- (4) Secure sensor to mounting bracket.
- (5) Secure conduit nut to sensor.
- (6) Tighten conduit lock nut.
- (7) Remove pull-wire from sensor leads.
- (8) Route sensor leads to terminal module and secure in place with clamps and ties. Install sleeves as required.
- (9) Cut sensor leads to correct length.
- (10) Perform NLG door up position sensor adjustment and test procedure (Ref. 32-61-06).
- (11) Connect sensor leads to applicable terminal modules as follows:

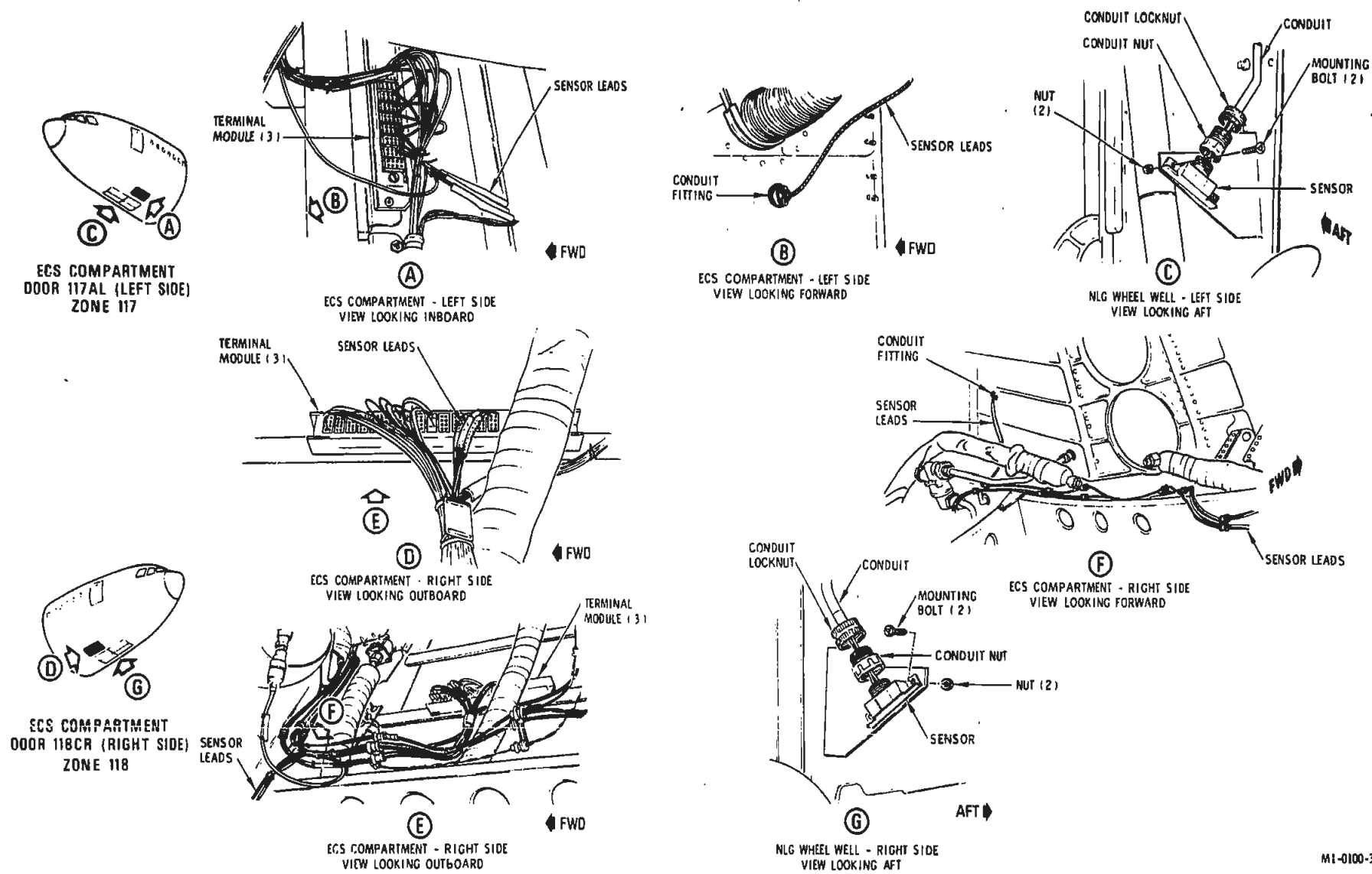
LOCATION	TERMINAL MODULE	LEAD WIRE NUMBER
Right Side	TB801-13-B	3261-77A-N (Yellow)
	TB801-14-B	3261-75A (Blue)
	TB801-15-B	3261-74A (Red)
Left Side	TB811-13-B	3261-50A-N (Yellow)
	TB811-11-B	3261-72A (Red)
	TB811-12-B	3261-64A (Blue)

- (12) Remove tags and close circuit breakers opened in Step 2A(1).

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001B

32-61-06
Page 402
May 15/87



**Nose Landing Gear Door Up Position Sensor
Removal and Installation
Figure 401**

M1-0100-32-384

32-61-06
Page 403/404
Feb 15/74

EFFECTIVITY: ALL

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NOSE LANDING GEAR DOOR UP POSITION SENSOR - ADJUSTMENT AND TEST**1. General**

This procedure contains instructions to adjust gap between the target and sensor, and to obtain adequate coverage of the sensor by the target with the door in the closed position (door open 5 degrees).

2. Equipment and Materials**3. Referenced Procedures**

24-00-00 External Power - Maintenance Practices

4. Adjustment/Test

CR A. Adjustment (Using Proximity Sensor Test Box) (Deleted)

B. Adjustment (Using Aircraft Indicator Light)

NOTE: This procedure uses the aircraft NOSE GEAR DOOR indicator light, located on the Flight Engineer/Second Officers lower panel, as an indicator.

(1) Turn on electrical power (Ref. 24-00-00).

(2) On pilots overhead circuit breaker panel CB1, verify that circuit breakers LANDING GEAR DOOR - POS IND (L13), PROX SW PWR NO. 1 and NO. 2 (L10, L11) are closed.

(3) Close door of sensor being adjusted, if not already closed.

NOTE: With door closed (door rod connected or fully compressed), door will be open approximately 5 degrees.

(4) Open other door.

(5) Place artificial target and 0.100-inch plastic spacer on sensor of opened door. (Spacer must be between sensor and target.)

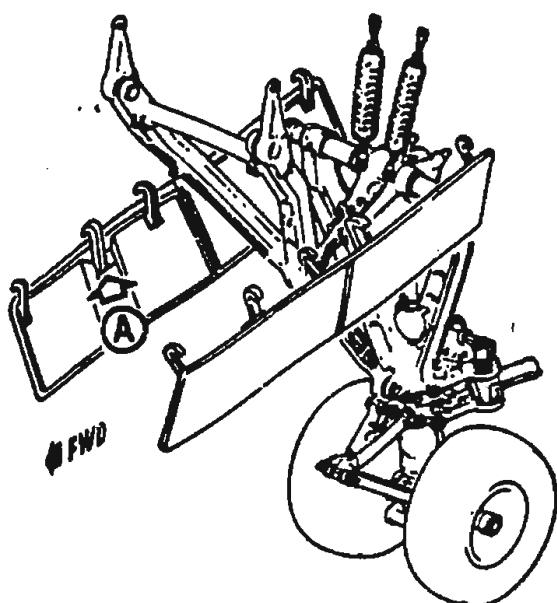
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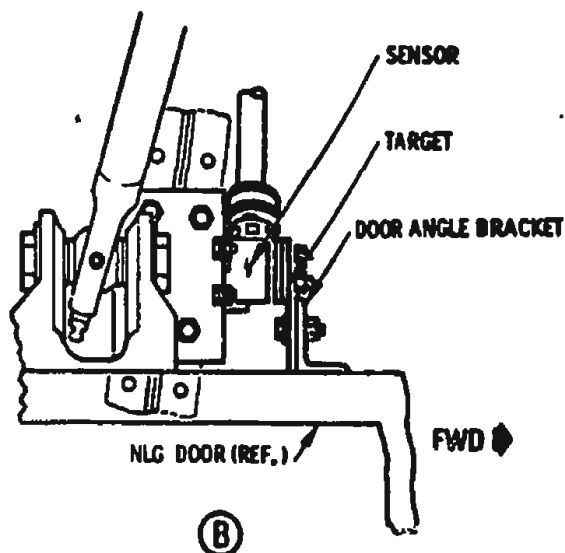
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Page 501
May 15/82

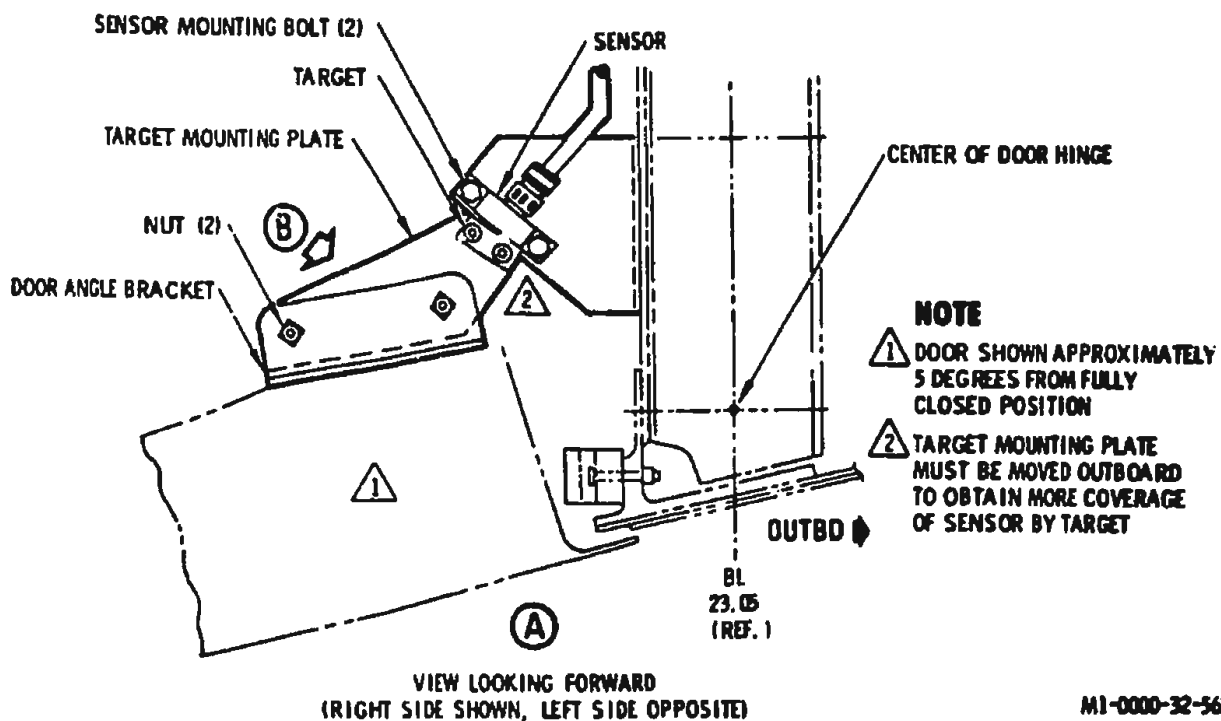
LOCKHEED
MAINTENANCE MANUAL



NOSE LANDING GEAR FORWARD DOORS
ZONE 712 AND 713



VIEW LOOKING OUTBOARD, DOOR CLOSED
(LEFT SIDE SHOWN, RIGHT SIDE OPPOSITE)



VIEW LOOKING FORWARD
(RIGHT SIDE SHOWN, LEFT SIDE OPPOSITE)

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Nose Landing Gear Door Up Position Sensor - Adjustment and Test
Figure 501

EFFECTIVITY: ALL

001B

32-61-06
Page 502
Aug 15/81



MAINTENANCE MANUAL

- (6) Check target-to-sensor gap. Gap must be 0.100 to 0.150 inch.
- (7) If target-to-sensor gap is not within tolerance, add or remove shims between sensor and mounting bracket until correct gap is obtained.
- (8) Loosen bolts securing target mounting plate to door angle bracket and slide plate as far inboard as slots will permit. If indicator light is on, perform Step (9). If light is off, proceed to Step (10).

NOTE: When target mounting plate bolts are loose, movement of the target toward the sensor (closing the gap) may cause the indicator light to go off. When light indications are to be noted, care must be exercised to ensure that the target mounting plate is firmly held to the door angle bracket.

- (9) Move target plate outboard until NOSE GEAR DOOR indicator light just goes off.
- (10) Move target plate 0.120 to 0.150 inch further outboard.
- (11) Tighten bolts securing target mounting plate to door. Ensure target face is parallel to sensor face.
- (12) Verify that indicator light is off.
- (13) Open door of sensor adjusted. Light must come on.
- (14) Remove artificial target and spacer from other door.
- (15) Turn off electrical power (Ref. 24-00-00).



MAIN LANDING GEAR INBOARD DOOR UPLOCK SENSOR REMOVAL AND INSTALLATION

1. Equipment and Materials

Lock-wire QQ-W-390, 0.040-inch diameter, inconel, condition A, or equivalent

2. Referenced Procedures

32-33-00 Main Landing Gear Inboard Door - Maintenance Practices

32-61-07 Main Landing Gear Inboard Door Uplock Sensor - Adjustment and Test

3. Removal/Installation

A. Removal

- (1) Open applicable main landing gear (MLG) inboard door (Ref. 32-33-00).
- (2) On pilots overhead circuit breaker panel CB1, zone 210, open and tag PROX SW PWR NO. 1 (L10), PROX SW PWR NO. 4 (L11), LANDING GEAR DOOR POS IND (L13) and WARN HORN (L12) circuit breakers.
- (3) In hydraulic service center, zone 147, FS 1275 (right side) or FS 1285 (left side) remove applicable sensor leads from terminal modules as follows:

LOCATION	TERMINAL MODULE	LEAD WIRE NUMBER
Right Side	TB896-3A	3261-58A-N (Yellow)
	TB896-1-B	3261-56C (Red)
	TB896-2-B	3261-57C (Blue)
Left Side	TB895-3-A	3261-44A-N (Yellow)
	TB895-1-B	3261-42C (Red)
	TB895-2-B	3261-43C (Blue)

- (4) Free leads of all clamps, ties, and sleeves.

- (5) Secure pull wire to sensor leads.

EFFECTIVITY: ALL

001B

32-61-07

Page 401
May 15/87



- (6) On aircraft 001-006 without SB 32-048, in applicable right, zone 148, or left, zone 149, wheel well; remove sensor as follows (Ref. Fig. 401):

- (a) Disconnect conduit nut from sensor.
- (b) Remove sensor mounting screws.
- (c) Ensure that sensor leads and pull-wire are free to be pulled through conduit.

NOTE: It may be necessary to disconnect conduit at rigid sections.

- (d) Remove sensor pulling leads through conduit until pull-wire is clear of conduit on both ends.

- (e) Disconnect sensor leads from pull-wire.

R

- (6) On aircraft 001-006 with SB 32-048, and 007-999, in applicable right, zone 148, or left, zone 149, wheel well; remove sensor as follows (Ref. Fig. 401):

- (a) Remove clamp mounting bolts and remove clamp.
- (b) Disconnect conduit nut from sensor.
- (c) Remove sensor mounting bolts.
- (d) Ensure that sensor leads and pull-wire are free to be pulled through conduit.
- (e) Remove sensor pulling leads through conduit until pull-wire is clear of conduit on both ends.
- (f) Disconnect sensor leads from pull-wire.

B. Installation

- (1) Secure sensor leads to pull-wire.
- (2) Pull sensor leads through conduit until sensor can be connected to conduit.
- (3) On aircraft 001-006 without SB 32-048, secure sensor to mounting bracket on door link.

R

- (3) On aircraft 001-006 with SB32-048, and 007-999, secure sensor to actuator linkage and secure conduit with clamp.

- (4) Safety conduit nut to sensor with lock-wire.

EFFECTIVITY: ALL

001B

32-61-07
Page 402
Aug 15/82



CAUTION: VERIFY THAT SENSOR AND SENSOR CONDUIT ARE SECURELY FASTENED.

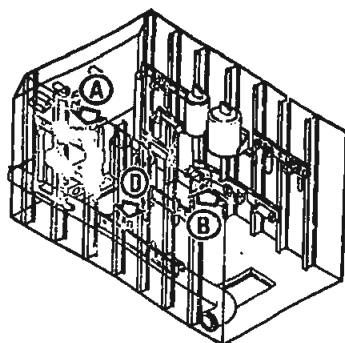
(5) Adjust sensor to target gap (Ref. 32-61-07).

(6) Connect sensor leads to applicable terminal block TB895 (left) or TB896 (right) as follows if not accomplished in Step 3B(5):

LOCATION	TERMINAL MODULE	LEAD WIRE NUMBER
Right Side	TB896-3-A	3261-58A-N (Yellow)
	TB896-1-B	3261-56C (Red)
	TB896-2-B	3261-57C (Blue)
Left Side	TB895-3-A	3261-44A-N (Yellow)
	TB895-1-B	3261-42C (Red)
	TB896-2-B	3261-43C (Blue)

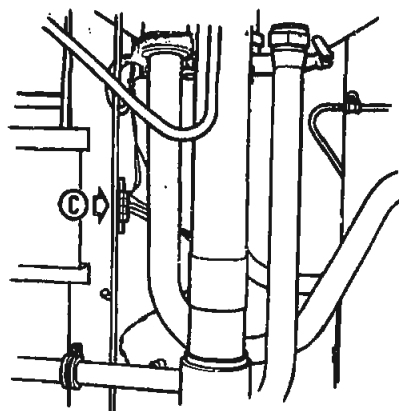
(7) Ensure that circuit breakers opened in Step 3A(2) are closed and tags are removed.

(8) Close applicable MLG inboard door (Ref. 32-33-00).

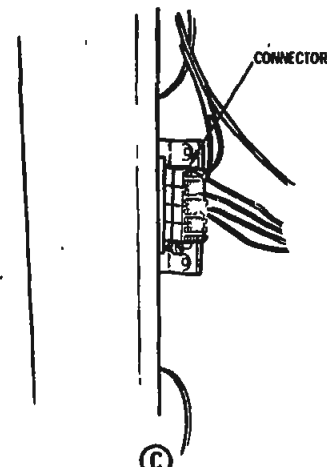


ZONE 147

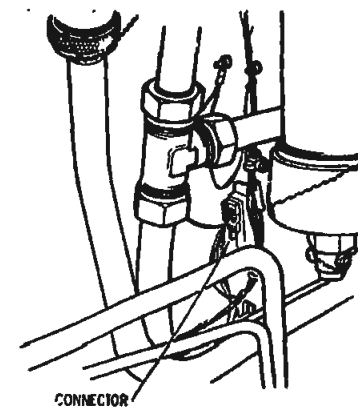
(A)
HYDRAULIC SERVICE CENTER



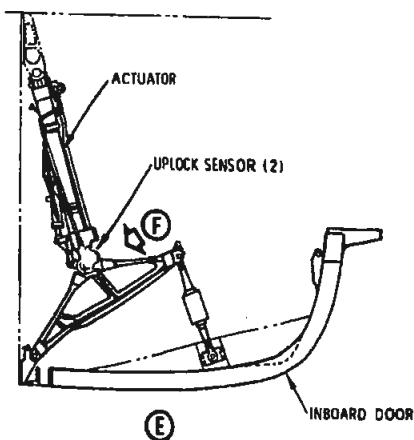
(B)
RIGHT SIDE CONNECTOR LOCATION



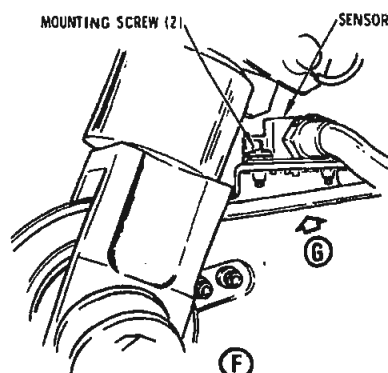
(C)
RIGHT SIDE CONNECTOR



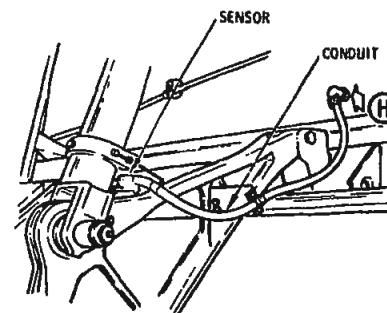
(D)
LEFT SIDE CONNECTOR



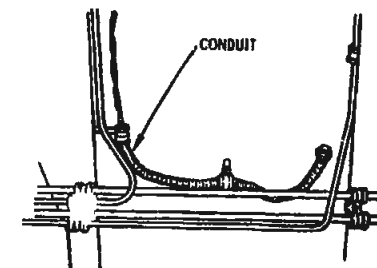
(E)



(F)
SENSOR



(G)
SENSOR CONDUIT IN WHEEL WELL



(H)
SENSOR CONDUIT IN
HYDRAULIC SERVICE CENTER

11-0000
M1-0100-32-305

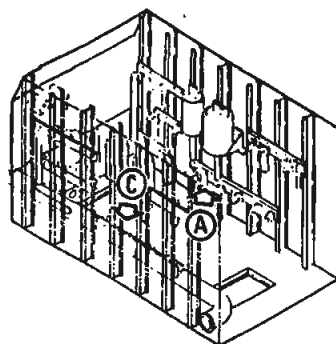
Main Landing Gear Inboard Door Uplock Sensor
Removal and Installation
Figure 401

EFFECTIVITY: 001-006 WITHOUT SB32-048

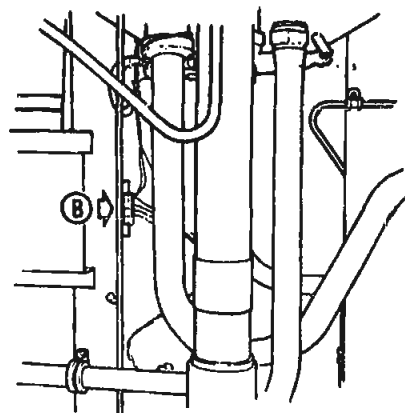
32-61-07
Page 405/406
Jun 15/95

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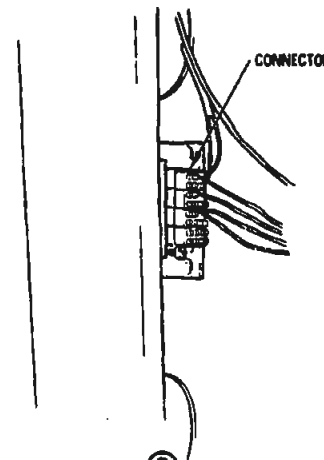
001B



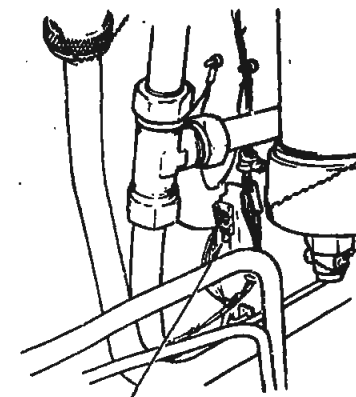
ZONE 147
HYDRAULIC SERVICE CENTER



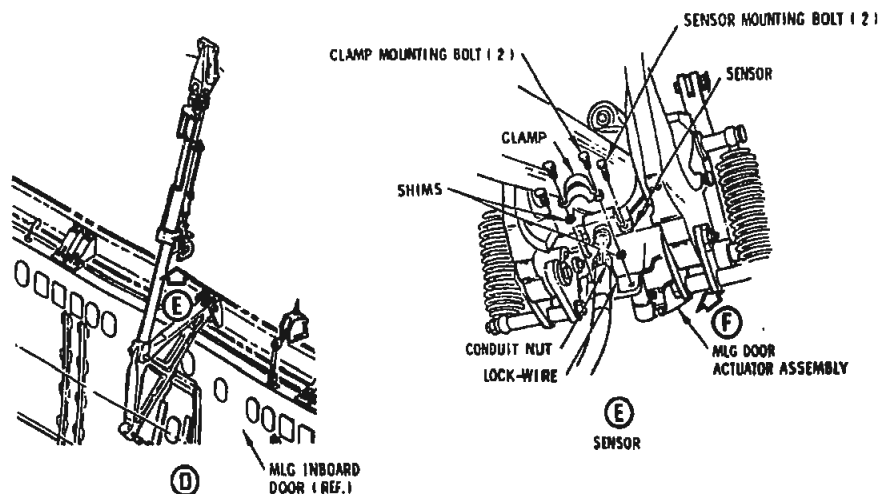
(A)
RIGHT SIDE CONNECTOR LOCATION



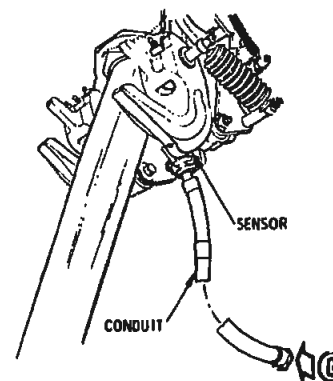
(B)
RIGHT SIDE CONNECTOR



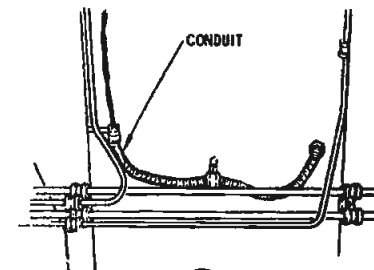
(C)
LEFT SIDE CONNECTOR



(D)
SENSOR



(F)
SENSOR CONDUIT IN WHEEL WELL



(G)
SENSOR CONDUIT IN
HYDRAULIC SERVICE CENTER

M1-0101-32-306

Main Landing Gear Inboard Door Uplock Sensor
Removal and Installation
Figure 401

EFFECTIVITY: 001-006 WITH SB 32-048 AND 007-999

32-61-07
Page 407/408
Jun 15/95

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001B

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MAINTENANCE MANUAL

MAIN LANDING GEAR INBOARD DOOR UPLOCK SENSOR
ADJUSTMENT AND TEST

1. Equipment and Materials

CR (Deleted)

2. Referenced Procedures

- 24-00-00 External Power - Maintenance Practices
- 29-11-00 Hydraulic Power System - Maintenance Practices
- 32-33-00 Main Landing Gear Inboard Door - Maintenance Practices
- 32-61-00 Landing Gear Position Indicating and Warning System - Adjustment and Test

3. Adjustment/Test

CR (Deleted)

INTENTIONALLY
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M1-000-SP-1LB

C
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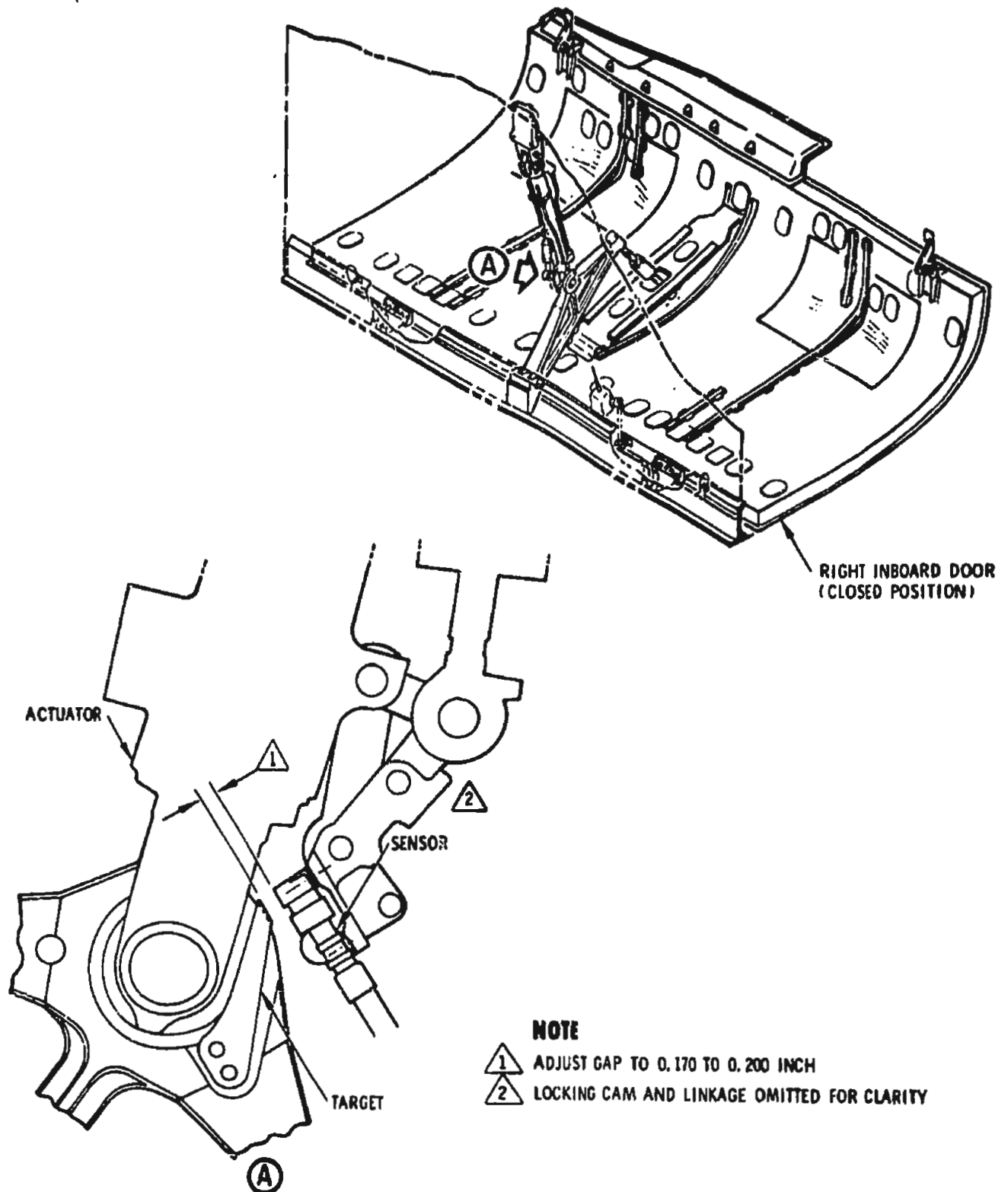
Main Landing Gear Inboard Door Uplock Sensor
Adjustment and Test
Figure 501

EFFECTIVITY: ALL

001B

32-61-07
Page 501
Nov 15/84

LOCKHEED
MAINTENANCE MANUAL



NOTE

- 1 ADJUST GAP TO 0.170 TO 0.200 INCH
- 2 LOCKING CAM AND LINKAGE OMITTED FOR CLARITY

M1-0000-32-2980

Main Landing Gear Inboard Door Uplock Sensor
Adjustment and Test
Figure 501

R
R
R

EFFECTIVITY: ALL

001B

32-61-07
Page 502
Nov 15/84



MAINTENANCE MANUAL

C A. Adjustment (Using Aircraft Indicator Lights)

NOTE: This procedure uses the aircraft LH GEAR DOOR or RH GEAR DOOR light, located on the Flight Engineer/Second Officers annunciator panel as an indicator.

(1) Turn on electrical power (Ref. 24-00-00).

(2) On pilots overhead circuit breaker panel CB1, verify that circuit breakers LANDING GEAR DOOR - POS IND (L13), PROX SW PWR NO. 1 and NO. 4 (L10, L11) are closed.

NOTE: Ensure applicable hook lock linkage is over center prior to adjustment of the MLG inboard door uplock sensor.

(3) With MLG door closed, locked, and no hydro power, adjust MLG inboard door uplock sensor by adding or removing shims to achieve a sensor to target gap of 0.170 - 0.200 inches.

(4) Open MLG inboard door (Ref. 32-33-00).

C (5) (Deleted)

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

CR (6) Turn on hydraulic system C pressure using ATM pump. AC
CR pump may not fully close and lock MLG door on some
CR aircraft (Ref. 29-11-00).

C (7) Close MLG inboard door.

(8) Turn off hydraulic system C pressure (Ref. 29-11-00).

C (9) With MLG inboard door closed, assure applicable RH GEAR
C DOOR OR LH GEAR DOOR light is off. Target must cover
C and be parallel to sensor face. Adjust sensor as
required if light is on.

EFFECTIVITY: ALL

001B

32-61-07
Page 503
May 15/86

LOCKHEED



MAINTENANCE MANUAL

- (10) Open MLG inboard door (Ref. 32-33-00).
- CR (11) Verify that when door is opened, applicable RH GEAR
CR DOOR or LH GEAR DOOR light is on.
- C (12) Close MLG inboard door (Ref. 32-33-00).
- CR (13) Verify that hydraulic system C pressure is off (Ref.
CR 29-11-00).
- CR (14) Turn off electrical power (Ref. 24-00-00).

EFFECTIVITY: ALL

001B

32-61-07
Page 504
Nov 15/84

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR TRUCK UNLEVEL POSITION SENSOR
REMOVAL AND INSTALLATION

1. General

This procedure contains instructions for removal and installation of both truck unlevel position sensors. The left sensor is the FCES sensor and the right sensor is the truck unlevel sensor. Electrical connection is the only difference between the two sensors.

2. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.420-inch diameter, or equivalent

3. Referenced Procedure

32-61-08 Main Landing Gear Truck Unlevel Position Sensor -
Adjustment and Test

4. Removal/Installation

A. Removal

- (1) At Flight Engineer/Second Officers circuit breaker panel CB3, open and tag PROXIMITY SWITCH 2 and PROXIMITY SWITCH 3 circuit breakers.
- (2) Ensure that downlock safety pin is installed in applicable landing gear.
- (3) Open cover of landing gear strut J-box (Ref. Fig. 401).
- (4) In strut J-box at terminal strip TB334 (center), remove lead wires from applicable terminal posts as follows:

	SENSOR	TERMINAL POST NUMBER	LEAD WIRE NUMBER
R	FCES/Truck	3	3261-37D (Red)
R	Unlevel (Right)		
R	FCES/Truck	4	3261-38D (Blue)
R	Unlevel (Right)		
R	FCES/Truck	5	3261-39H (Yellow)
R	Unlevel (Right)		

EFFECTIVITY: ALL

32-61-08
Page 401
Feb 15/74

LOCKHEED
MAINTENANCE MANUAL

SENSOR	TERMINAL POST NUMBER	LEAD WIRE NUMBER
FCES (Left)	12	2217-119A (Blue)
FCES (Left)	13	2217-120A (Red)
FCES (Left)	14	2217-121A (Yellow)

(5) Attach pull-wire to lead wires.

(6) Remove bolts securing sensor to mounting lug.

NOTE: If sensor mounting bracket is removed to simplify sensor change, be certain to reinstall bracket correctly.

(7) Remove sensor from mounting lug and position in open area, clear of strut. Remove clamps securing flex conduit as required.

(8) Loosen rigid conduit B-nut and unscrew from sensor.

(9) Remove J2 MLG TRUCK JUNCTION BOX cover.

(10) Remove sensor from conduit while feeding lead wires and pull-wire through conduit. Use access provided by open truck J-box to aid wire removal as required.

(11) Remove sensor and lead wires. Leave pull-wire in conduit for installation procedure.

B. Installation

(1) Ensure that circuit breakers opened in Step 4A(1) are open.

(2) Attach pull-wire to sensor lead wires.

(3) Pull wires through conduit until sensor is in contact with rigid conduit.

(4) Install B-nut and tighten.

(5) Safety B-nut with lock-wire.

(6) Install sensor to mounting lug and secure with bolts and nuts.

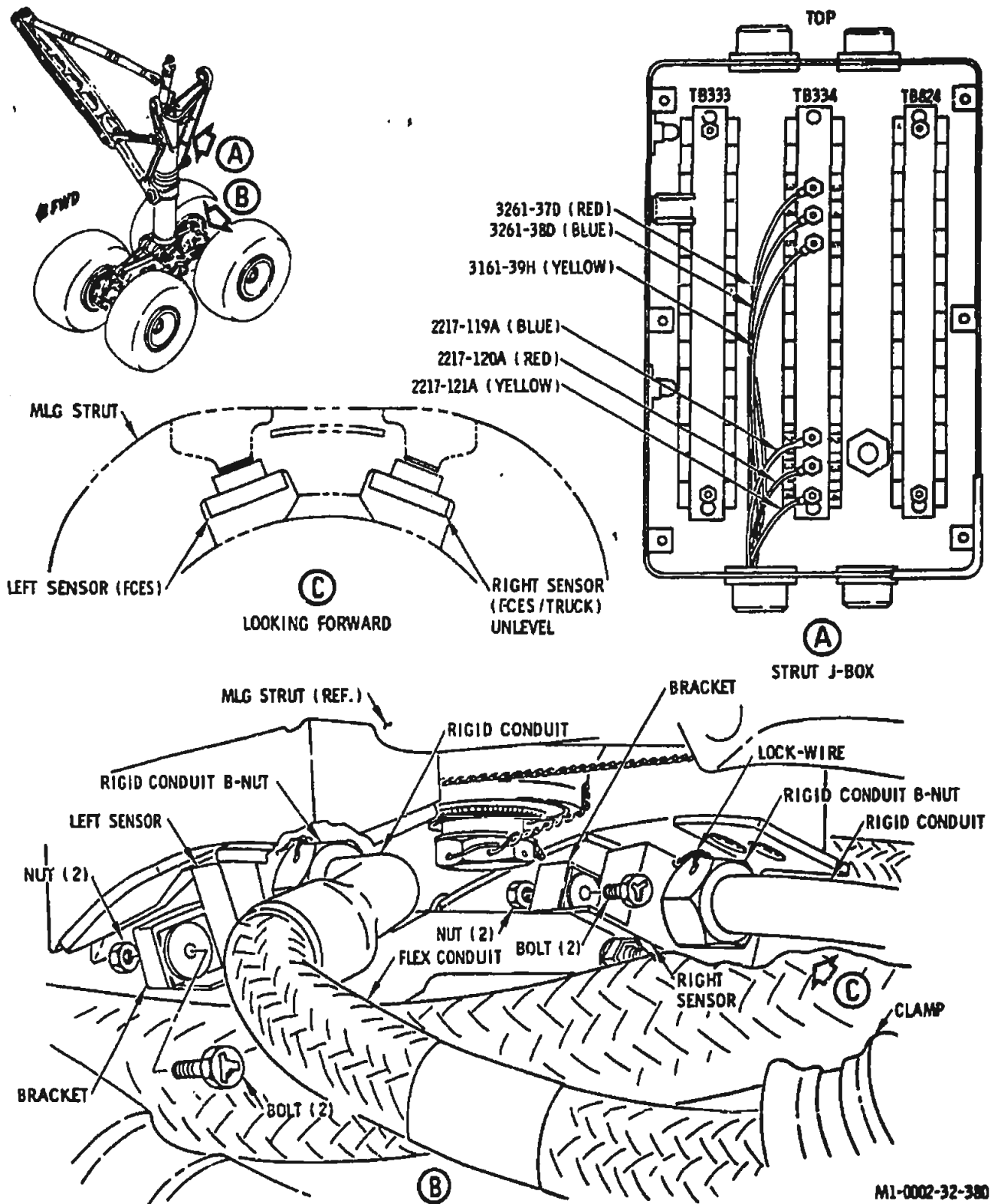
(7) Disconnect sensor lead wires from pull-wire.

EFFECTIVITY: ALL

32-61-08
Page 402
Dec 15/80

001B

LOCKHEED
MAINTENANCE MANUAL



M1-0002-32-380

Main Landing Gear Truck Unlevel Position Sensor
Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-61-08
Page 403
Dec 15/80

001B



- (8) Connect applicable lead wires to strut J-box terminal strip TB334 (center) terminal posts as follows:

SENSOR	TERMINAL POST NUMBER	LEAD WIRE NUMBER
FCES/Truck Unlevel (Right)	3	3261-37D (Red)
FCES/Truck Unlevel (Right)	4	3261-38D (Blue)
FCES/Truck Unlevel (Right)	5	3261-39H (Yellow)
FCES (Left)	12	2217-119A (Blue)
FCES (Left)	13	2217-120A (Red)
FCES (Left)	14	2217-121A (Yellow)

- (9) Install strut J-box cover.
- (10) Install truck J-box cover.
- (11) Remove tags and close circuit breakers opened in Step 4A(1).
- (12) Perform sensor adjustment and test (Ref. 32-61-08).



MAINTENANCE MANUAL

R MAIN LANDING GEAR TRUCK UNLEVEL POSITION SENSOR
R ADJUSTMENT AND TEST

R 1. General

R This procedure contains instructions for adjustment and test of
R all four truck unlevel sensors.

R 2. Equipment and Materials

R Clinometer (capable of being read to 0.10 degree)

R 90-degree Screwdriver, Locally Fabricated

Multimeter, Simpson 260, or equivalent

Resistor, 200 ohms, 5 watts

Artificial Target, 0.050-inch thick, 4130 steel, or equivalent

R Axle Jack, Model 862, Malabar Mfg. Co., or equivalent

3. Referenced Procedures

7-12-00 Axle Jacking - Maintenance Practices

R 22-10-11 AFCS/MLG Accessory Unit - Removal and Installation

24-00-00 Electrical Power - Maintenance Practices

31-22-00 Proximity Switch Card Box and Proximity Logic Box -
Maintenance Practices

33-17-00 Indicator Lights Test - Maintenance Practices

4. Adjustment/TestA. Preliminary Procedures

NOTE: These preliminary procedures do not apply to Step C
which contains adjustment procedures not requiring
axle jacking to tilt the truck.

(1) Ensure that downlock safety pins are installed in all
three landing gears.

(2) Turn on electrical power (Ref. 24-00-00).

EFFECTIVITY: ALL

001B

32-61-08
Page 501
Nov 15/82



MAINTENANCE MANUAL

- (3) On the Flight Engineer/Second Officers CB2 circuit breaker panel, zone 215, ensure that TRUCK LEVEL (F16) and MLG GND SENSE (L8) circuit breakers are closed and tagged.

On pilots overhead CB1 circuit breaker panel, zone 210, ensure that PROX SW PWR - NO. 1 (L10) and NO. 4 (L11) circuit breakers are closed and tagged.

- (4) Establish communications between flight station, landing gear area, and forward electronic service center.
- (5) Perform BITE test of proximity switch card box and proximity logic box (Ref. 31-22-00).
- (6) Perform indicator lights test using WARN/CAUTION/ADVISORY LIGHTS TEST switch on pilots overhead panel and Flight Engineer/Second Officers panel (Ref. 33-17-00).
- (7) On pilots center overhead panel, depress DLC/AUTO SPLR 1 and 2 switchlights to OFF position.
- (8) In forward electronic service center, loosen fasteners and remove AFCS/MLG accessory unit (LG LOGIC RELAY UNIT) by pulling unit out of rack (Ref. 22-10-11).

NOTE: When the left and/or right (FCES/TRUCK) sensors (or related targets) of either landing gear is to be adjusted, voltage measurements will be made at the following pins:

R
R
R
R

R
R
R
R
R

TRUCK LEVEL/TILT SENSOR	AFCS MLG ACCY UNIT
L MLG OUTBOARD	P1B PIN 7
L MLG INBOARD	P1A PIN 27
R MLG INBOARD	P1A PIN 7
R MLG OUTBOARD	P1B PIN 27

- (9) Ensure that LANDING GEAR control lever is in DOWN position and tagged to prevent operation.
- (10) Measure truck positioner length from centers of attachment bolts. Measurement should be 15.85 (± 0.03) inches (Ref. Fig. 501). This dimension positions truck in a right angle relationship to strut at 0(± 0.5)-degree tilt.
- (11) If measurement made in Step (10) is not within tolerance, adjust length of positioner by jacking truck at applicable axle (Ref. 7-12-00). If positioner is

EFFECTIVITY: ALL

001B

32-61-08

Page 502
Nov 15/88



too short, jack at rear axle. If positioner is too long, jack at front axle.

- (12) When correct positioner length has been achieved, place clinometer on truck J-box or other suitable position and read clinometer. The truck is at right angle to the strut.

B. Adjustment of Sensors

NOTE: To perform this procedure, the truck must be tilted forward and aft by jacking at axle jack points. If in the preliminary procedures it was found necessary to jack at either axle to obtain a right angle relationship between the truck and strut, that jack must be left in place when the other axle is jacked to attain the correct truck tilt angle.

- (1) Perform preliminary procedures contained in Step A.
- (2) Jack under rear axle jack pad to tilt the forward end of truck down between 5 and 10 degrees to provide clearance for adjustment.
- (3) Using thickness gage check gap between sensors and targets. The gap must be 0.100 to 0.150 inches.
- (4) If gap is not within limits, loosen sensor mounting screw and move sensor up or down to obtain correct gap (Ref. Fig. 502). Tighten mounting screw and insure target is parallel to sensor face.

NOTE: Adjustment screw rotates a cam for sensor height adjustment.

- (5) Connect a 200-OHM, 5-watt resistor from applicable AFCS/MLG accessory box receptacle pin 7 or 27 to ground.
- (6) Set a multimeter to the scale which will permit 28V dc to be read on meter. Connect meter across resistor.
- (7) Level truck to right angle with strut. There should be a 0V dc indication at this time.
- (8) Lower and remove jacking equipment.
- (9) Turn off electrical power (Ref. 24-00-00).
- (10) Remove tags from circuit breakers called out in Step 4A(3).



- (11) Disconnect multimeter and resistor from receptacle and install AFCS/MLG accessory unit (Ref. 22-10-11).

C. Adjustment of Sensor Without Jacking Aircraft Truck

NOTE: This procedure applies when conditions do not permit axle jacking of a truck.

It is not to be considered as a normal maintenance practice and Steps 4A and 4B should be performed at the next maintenance check to ensure accurate sensor adjustment.

- (1) Using thickness gage, check gap between sensor and targets. Gap must be 0.100 to 0.150 inch (Ref. Fig. 501).
- (2) If gap is not within tolerance, loosen sensor mounting bracket screw, and reposition sensor up or down until correct gap is indicated. Tighten mounting screw. Ensure that target is parallel to sensor face.

D. Sensor Test

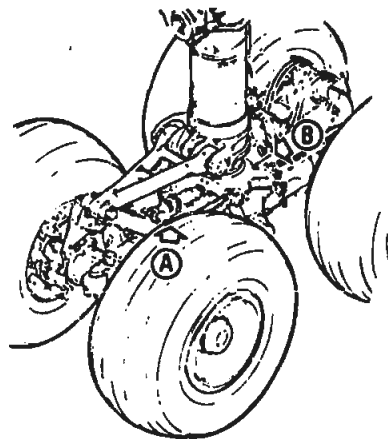
- (1) Perform Steps 4A(1) through 4A(9).
- (2) Connect a 200-ohm, 5-watt resistor from applicable AFCS/MLG accessory unit receptacle pin 7 or 27 to ground.
- (3) Set multimeter scale to read approximately 28V dc and connect across resistor.
- (4) Position 0.050-inch thick 4130 steel shim (artificial target) between sensor and target with 0.050-inch thick plastic spacer between artificial target and sensor. A 28V dc indication should appear on multimeter when multimeter and resistor are connected to applicable AFCS/MLG unit receptacle pin 7 or 27.
- (5) Disconnect multimeter and resistor from receptacle and reinstall AFCS/MLG accessory unit.
- (6) Turn off electrical power (Ref. 24-00-00).
- (7) Remove tags from circuit breakers called out in Step 4A(3).

R EFFECTIVITY: ALL

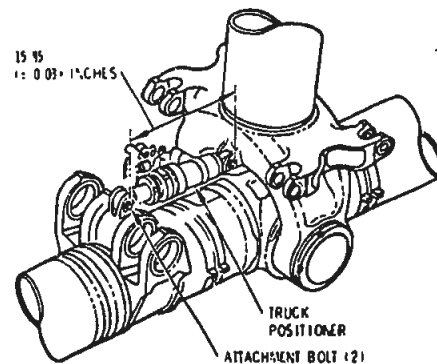
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32-61-08

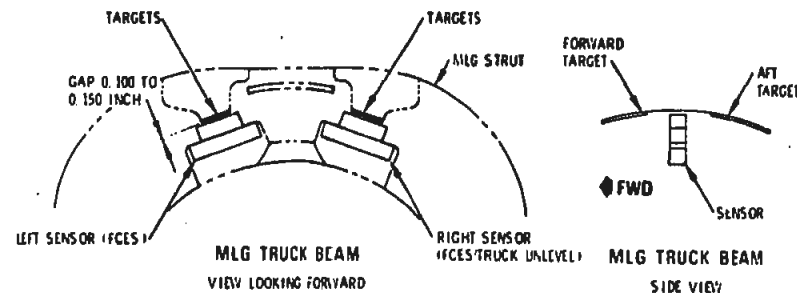
Page 504
Nov 15/88



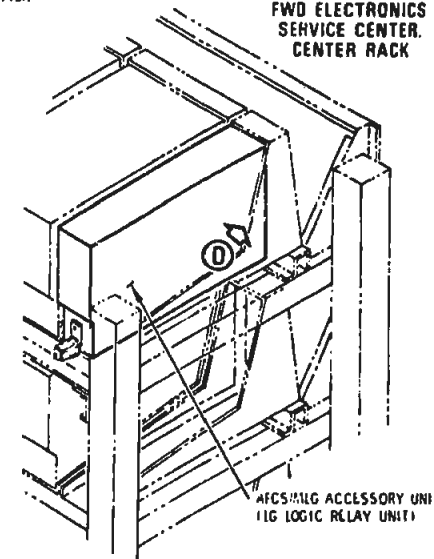
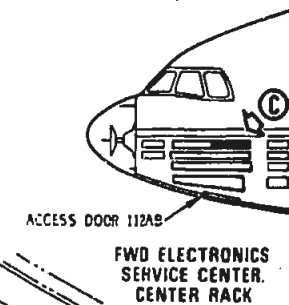
MLG TRUCK
ZONE 731 OR 741



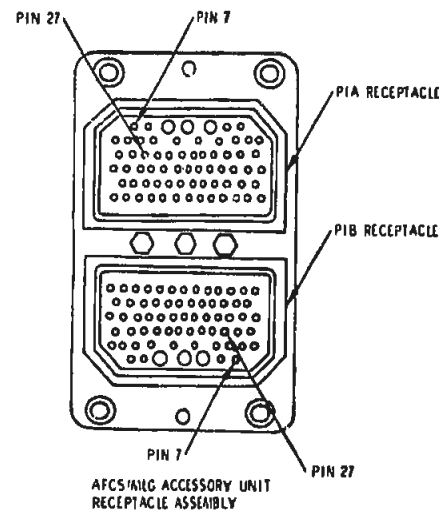
(A)



(B)



(C)

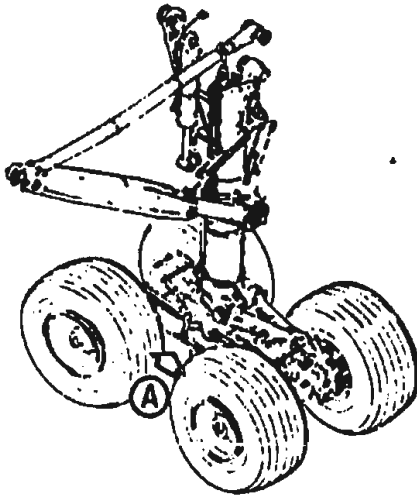


(D)

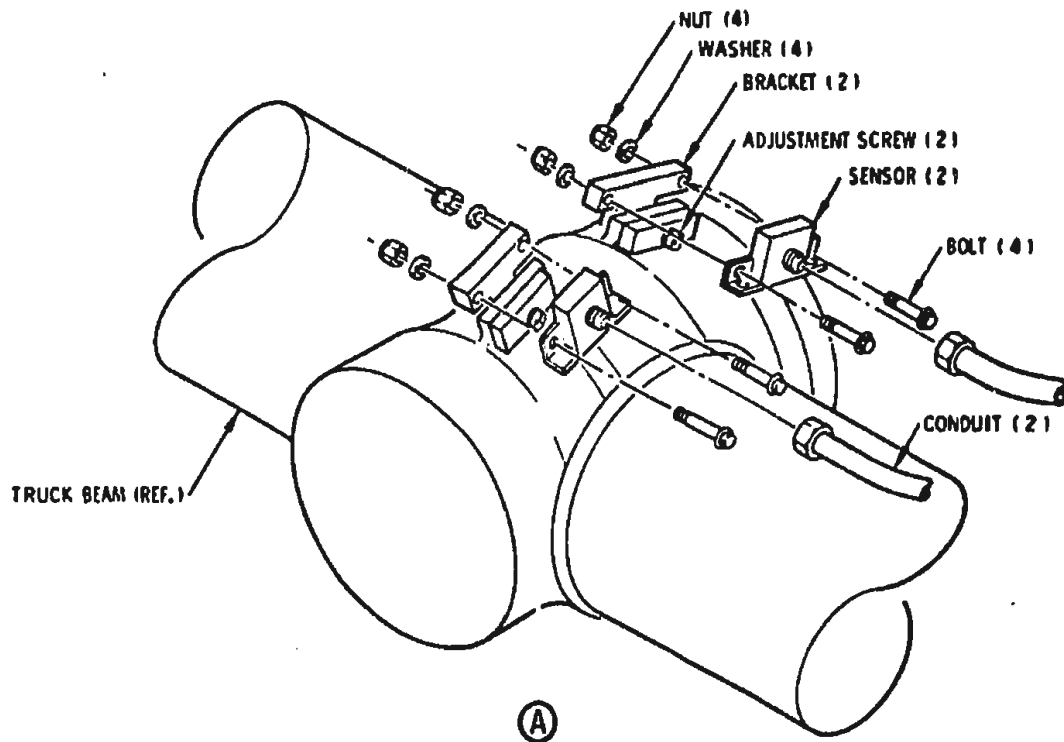
Main Landing Gear Truck Unlevel Position Indicator
Component Identification
Figure 501

EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL



MLG TRUCK
ZONE 731 OR 741



M1-21100-32-453

Truck Unlevel Sensor Mounting
Figure 502

R
R
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001B

EFFECTIVITY: ALL

32-61-08
Page 507/508
Nov 15/82

LOCKHEED
MAINTENANCE MANUAL

R MAIN LANDING GEAR MECHANICAL DOWNLOCK INDICATOR
R MAINTENANCE PRACTICES

R 1. General

R This procedure applies lubrication to the indicator assembly
R flexible actuating cable, as required, to free a binding
R condition causing partial extension of the pop-up indicator
R button. Performance of this procedure is limited to those
R assemblies which appear to be otherwise operational.

R 2. Equipment and Materials

R Lubricant, WD-40, or equivalent

R Masking tape, or equivalent

R 3. Maintenance Practices

R A. Lubrication

R (1) In applicable main landing gear (MLG) wheel well
R beneath wing upper skin, place masking tape around
R indicator body to cover water drain holes (Ref. Fig.
R 201).

R (2) Pour lubricant around pop-up button.

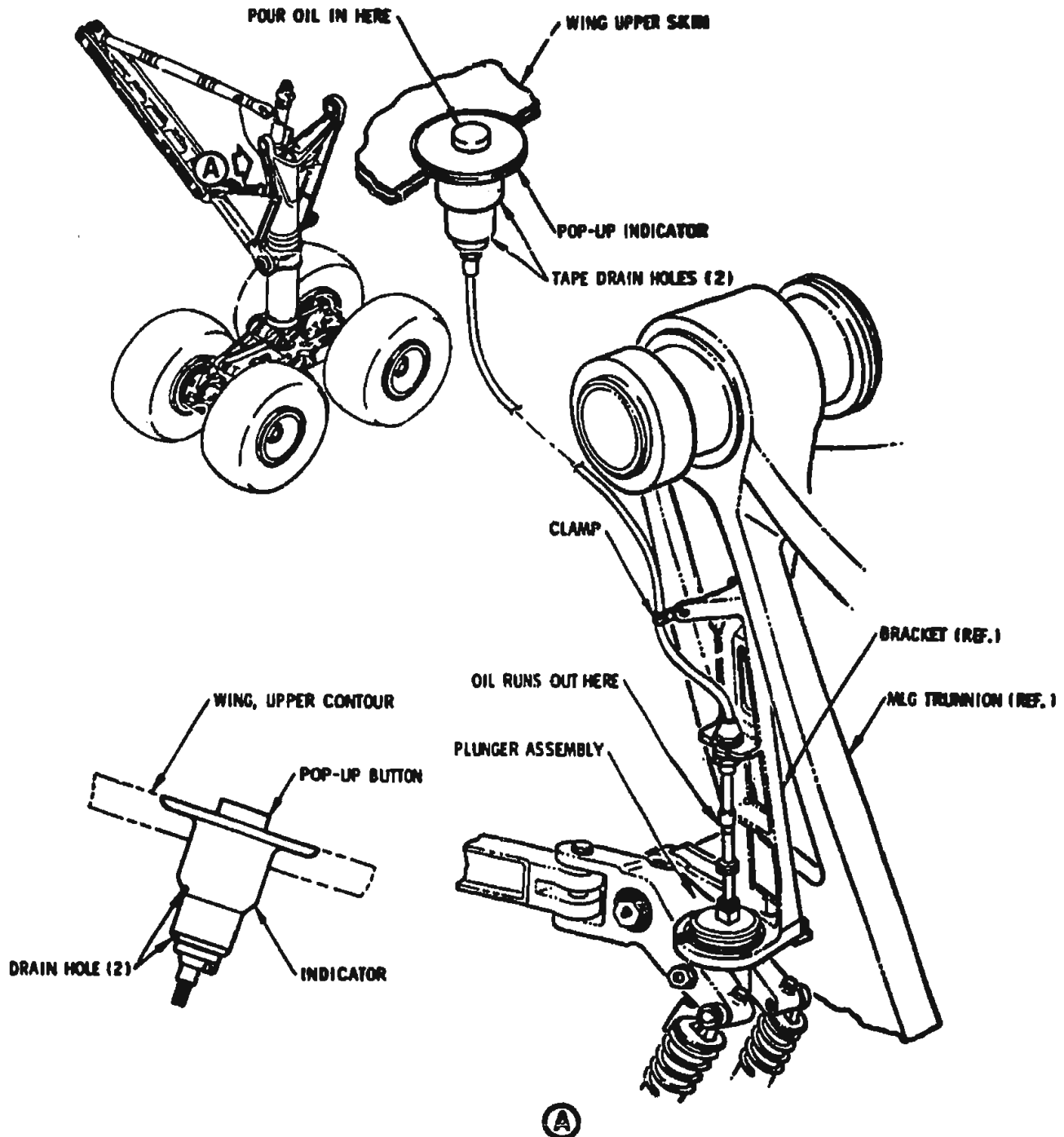
R (3) Exercise pop-up button by applying enough downward
R pressure to move it down against spring load.

R NOTE: Considerable effort must be expended because the
R total required to move the button can be as high
R as 92 pounds. It may be necessary to remove
R clamp to straighten out cable.

R (4) Apply lubricant until it runs out lower end of flexible
R cable.

R (5) Exercise button until it operates freely and remains in
R fully extended position. Remove tape. Wipe off excess
R lubricant.

LOCKHEED
MAINTENANCE MANUAL



ML-0100-32-323

MLG Mechanical Indicator Lubrication
Figure 201

R
R
001B EFFECTIVITY: ALL

32-61-09
Page 202
Mar 15/80

LOCKHEED
MAINTENANCE MANUAL

R MAIN LANDING GEAR MECHANICAL DOWNLOCK INDICATOR
R REMOVAL AND INSTALLATION

R 1. Equipment and Materials

R Lock-wire, QQ-W-390, 0.040-inch diameter, inconel, condition A,
R or equivalent

R 2. Referenced Procedures

R 32-10-00 Main Landing Gear Inboard Door - Maintenance
R Practices

R 32-61-09 Main Landing Gear Mechanical Downlock Indicator -
R Adjustment and Test

R 3. Removal/Installation

R A. Removal

- R (1) Open main landing gear (MLG) inboard door and install
R MLG inboard door actuator lock (Ref. 32-10-00).
- R (2) At forward side of MLG trunnion zone 731 or 741, loosen
R locknut and washer, securing mechanical downlock
R indicator shaft assembly and cable assembly to mounting
R bracket (Ref. Fig. 401).
- R (3) Remove screws and clips securing plunger assembly in
R mounting bracket opening.
- R (4) Remove bolt and nut, and remove cable assembly clamp
R from mounting bracket.
- R (5) Remove B-nut securing cable assembly to indicator.
- R (6) Slide cable assembly out of indicator.
- R (7) Remove cable, shaft, and plunger assemblies from
R mounting bracket.
- R (8) At wing upper surface, zone 541 or 641, remove screws
R securing indicator to mounting ring.
- R (9) Remove indicator from mounting ring.

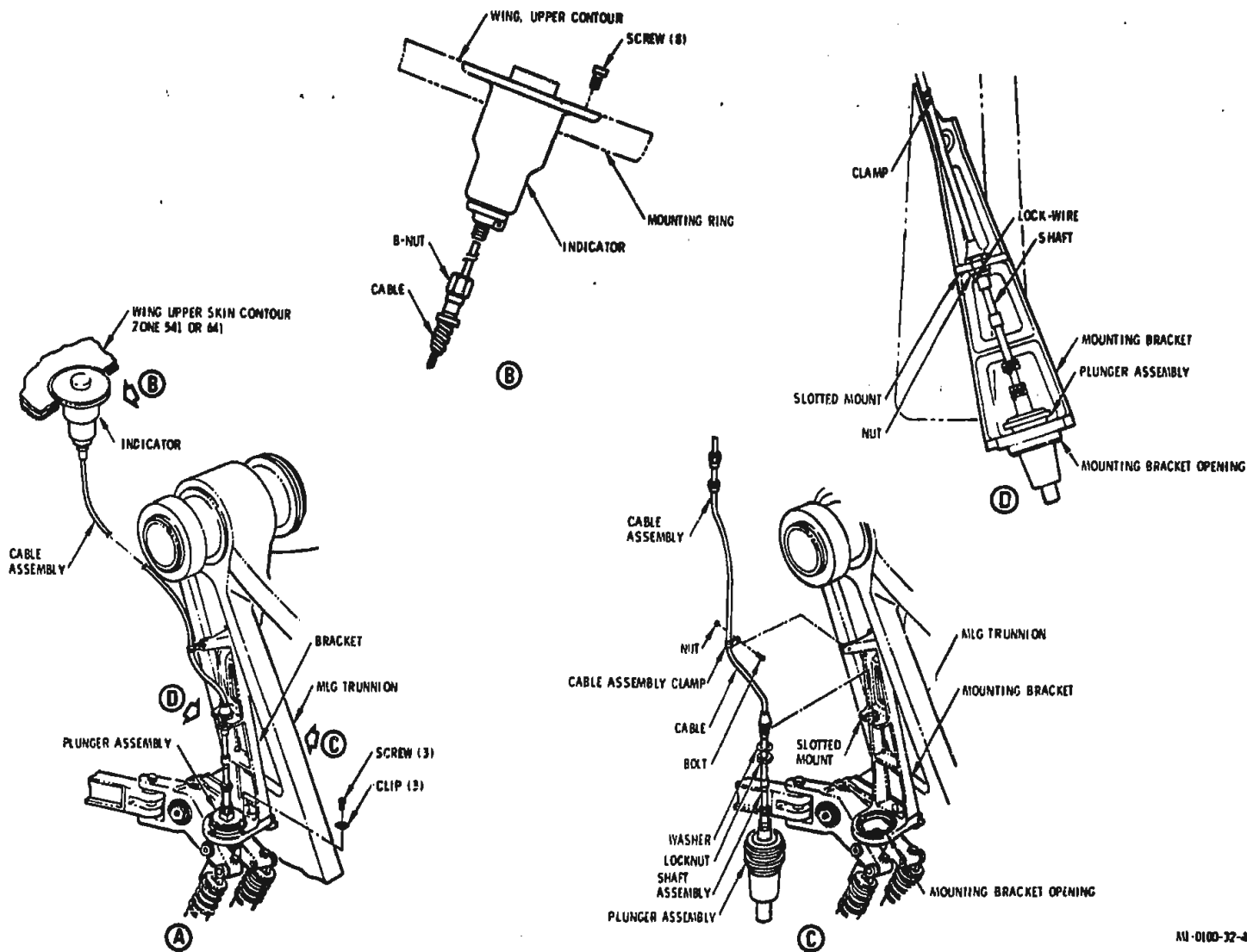
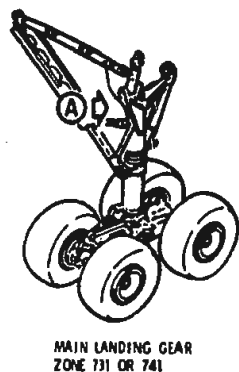
R B. Installation

R EFFECTIVITY: ALL
R
001B

32-61-09
Page 401
Aug 15/76



- R (1) Ensure that MLG inboard door is open and locked.
- R (2) Insert indicator through opening in wing upper surface,
R zone 541 or 641.
- R (3) Secure indicator to mounting ring with screws.
- R (4) At forward side of MLG trunnion, position plunger,
R shaft, and cable assemblies in mounting bracket.
- R (5) Secure shaft assembly in place with washer and nut.
- R (6) Tighten nut to a torque of 80 to 100 lb in.
- R (7) Safety nut with lock-wire.
- R (8) Secure plunger assembly in mounting bracket opening
R with clips and screws.
- R (9) Insert upper end of cable assembly into indicator and
R tighten B-nut.
- R (10) Safety B-nut with lock-wire.
- R (11) Using cable assembly clamp, bolt, and nut, secure cable
R assembly to mounting bracket.
- R (12) Perform MLG mechanical downlock indicator adjustment
R and test (Ref. 32-61-09).
- R (13) Remove MLG inboard door actuator lock, and close door
R as required (Ref. 32-10-00).



NI-0100-32-401

Main Landing Gear Mechanical Downlock Indicator
Removal and Installation
Figure 401

32-61-09
Page 403/404
Aug 15/76

R
R
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001B EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR MECHANICAL DOWNLOCK INDICATOR
ADJUSTMENT AND TEST

1. Equipment and Materials

Lock-wire, QQ-W-390, 0.040-inch diameter, inconel, condition A, or equivalent

2. Referenced Procedure

R 32-33-00 Main Landing Gear Inboard Door - Maintenance Practices

3. Adjustment/Test

A. Adjustment

- R (1) Open main landing gear (MLG) inboard door, and install MLG inboard door actuator lock (Ref. 32-33-00).
- (2) At forward side of MLG trunnion, zone 731 or 741, loosen locknut securing adjustment nut (Ref. Fig. 501).
- (3) Loosen locking nut securing shaft in slotted mount.
- (4) Loosen cable clamp securing cable to mounting bracket so that cable is free of bracket.
- R (5) Loosen screws securing clips which hold plunger assembly in mounting bracket opening. (6) Rotate
R adjustment nut up or down on shaft threads until
R indicator button on wing upper surface, zone 541-641,
R is 0.50 inch above wing contour.
- R (7) Ensure that plunger assembly is seated firmly in mounting bracket opening.
- R (8) Tighten screws holding clips. (9) Adjust shaft in slotted mount so that shaft is aligned to plunger assembly. Tighten locking nut.
- R (10) Verify that cable and shaft are not binding by depressing indicator button and allowing it to return to the correct position (Ref. Fig. 501).
- R (11) Tighten locknut and safety with lock-wire.
- R (12) Secure cable and clamp to mounting bracket.

EFFECTIVITY: ALL

0018

32-61-09
Page 501
May 15/82

LOCKHEED



MAINTENANCE MANUAL

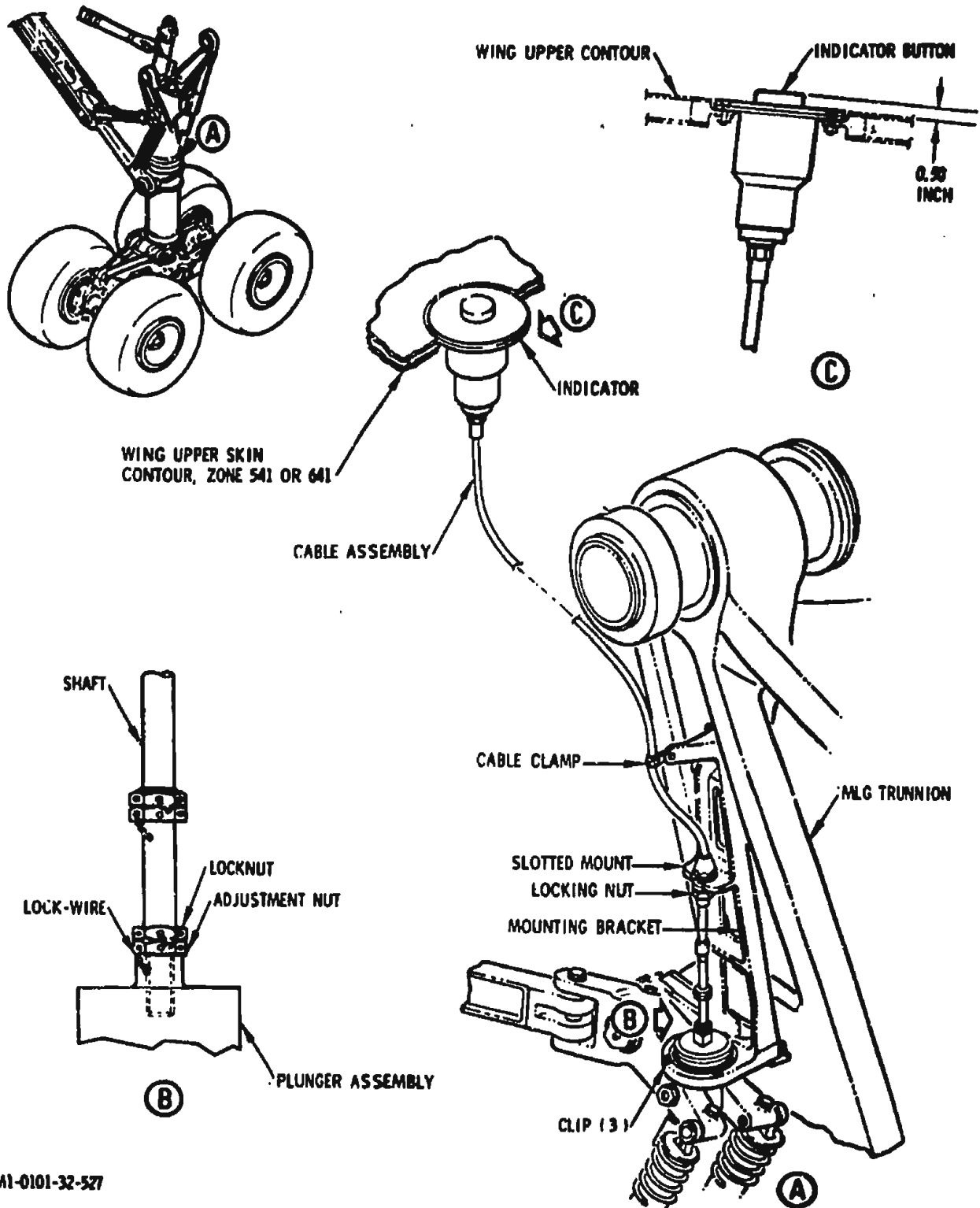
- R (13) Repeat Step (9).
- R (14) Remove MLG inboard door actuator lock and close door as
R required (Ref. 32-33-00).

EFFECTIVITY: ALL

0018

32-61-09
Page 502
May 15/82

LOCKHEED
MAINTENANCE MANUAL



M1-0101-32-527

Main Landing Gear Mechanical Downlock Indicator
Adjustment and Test
Figure 501

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001B

EFFECTIVITY: ALL

32-61-09
Page 503/504
Aug 15/76

LOCKHEED
MAINTENANCE MANUAL

MAIN LANDING GEAR MECHANICAL DOWNLOCK INDICATOR
CLEANING AND PAINTING

1. General

This procedure contains instructions for cleaning and maintaining the visual reference surfaces of the downlock indicator that are exposed to weather.

2. Equipment and Materials

Epoxy Primer, Lockheed Specification LCM37-1035, Deft Chemical Coatings, or equivalent

Polyurethane Topcoat, Lockheed Specification C37-1348, Color Code LAC 1071A (Gray), Sterling Laquer Mfg. Co., or equivalent

Polyurethane Finish Coat, FED-STD-595, Color No. 37038 (Lusterless Black), or equivalent

On aircraft 001-031 without SB32-097,
Polyurethane Gloss, Lockheed Specification C37-1103, Type III, Color Code LAC 2503A (International Orange), Sterling Laquer Mfg. Co., or equivalent

R On aircraft 001-031 with SB32-097,
Polyurethane Semi-gloss, Lockheed Specification C-37-1103, Type IV, Grade A, Black, Sterling Laquer, Mfg. Co., or equivalent

Scotchlite Tape, White, No. 3280, 3M Co., or equivalent

Protective Coating, 01-X-20 Clear Epoxy, Deft Chemical Co., or equivalent

Cleaning Solvent, 101 KE, Leeder Chemicals Inc., or LCM-32-1087, or equivalent

3. Referenced Procedures

20-11-03 Application of Decals, Fluid Line Identification Tape, and Similar Plastic Films to Exterior and Interior Aircraft Surfaces - LCP 82-1007A - Maintenance Practices

20-51-09 Application of Phosphate Ester Resistant Primer - LCP78-1131C - Maintenance Practices

EFFECTIVITY: ALL

001B

32-61-09
Page 701
Nov 15/88



- 20-51-10 Application of Water Resistant Polyurethane Enamel
- LCP781133C - Maintenance Practices
- 20-51-11 Application of Exterior Coating System For the
L-1011 Aircraft - PB78-433B - Maintenance Practices

4. Cleaning/Painting

A. Cleaning

- (1) Remove downlock indicator in accordance with Paragraph 5A.
- (2) Clean and prepare surfaces to be painted (Ref. 20-51-09).
- (3) Mask areas adjacent to surfaces to be painted (Ref. Fig. 701).
- (4) On aircraft 001-031 with SB32-097, and 032-999, clean and prepare surfaces to be retaped (Ref. 20-11-03).

R
R

B. Painting and Taping

- (1) On aircraft 001-031 without SB32-097, proceed as follows:
 - (a) Apply one coat of epoxy primer to cover, and pop-up indicator top surface and grooves (Ref. 20-51-09).
 - (b) Apply one coat of polyurethane topcoat to pop-up indicator top surface (Ref. 20-51-10).
 - (c) Apply one coat of polyurethane lusterless black to cover (Ref. 20-51-11).

CAUTION: PAINT MUST NOT BE APPLIED TO THE POP-UP INDICATOR OR ADJACENT TO THE GROOVES OR TO THE ID SURFACE OF THE COVER.

- (d) Apply one coat of epoxy primer to pop-up indicator grooves (Ref. 20-51-09).
- (e) Apply one coat of polyurethane topcoat over epoxy primer (Ref. 20-51-10).
- (f) Apply one coat of polyurethane gloss over topcoat (Ref. 20-51-11).

EFFECTIVITY: ALL

32-61-09
Page 702
Mar 15/91

001B

LOCKHEED
MAINTENANCE MANUAL

- R
R
- (1) On aircraft 001-031 with SB32-097, proceed as follows:
- (a) Apply one coat of epoxy primer to pop-up indicator narrow grooves (not covered with tape) (Ref. 20-51-09).
 - (b) Apply one coat of polyurethane top coat over primer (Ref. 20-51-10).
 - (c) Apply one coat of U (Series) or semi-gloss black, LACC-37-1103, Type IV, Grade A paint (Ref. Fig. 701).
 - (d) Install tape (Scotch 3200 Series) on dry surface of pop-up indicator wide grooves (Ref. 20-11-03). Cut tape to fit grooves.

NOTE: A 0.020-inch gap is permitted between tape ends. No overlap of tape ends is allowed.

- (e) Coat tape with 01-X-20, clear epoxy protective coating.
- (1) On aircraft 032-999, proceed as follows:
- (a) Install tape (Scotch 3200 Series) on dry surface of pop-up indicator wide grooves (Ref. 20-11-03).

NOTE: A 0.020-inch gap is permitted between tape ends. No overlap of tape ends is allowed.

- R
R
- (b) Coat tape with 01-X-20, clear epoxy protective coating (Ref. 20-11-03).
- (2) Reinstall pop-up indicator in accordance with Paragraph 5B.

5. Removal and Installations of Downlock Indicator

A. Removal

- (1) On wing upper surface, remove screws securing indicator to mounting ring.
- (2) Remove indicator cover, pop-up indicator, and spring from housing.

B. Installation

EFFECTIVITY: ALL

001B

32-61-09
Page 703
Nov 15/89

LOCKHEED



MAINTENANCE MANUAL

- R (1) Position pop-up indicator in housing. Ensure actuation
- R cable properly engages plunger.
- R (2) Position spring over pop-up indicator.
- R (3) Install cover and secure with screws.

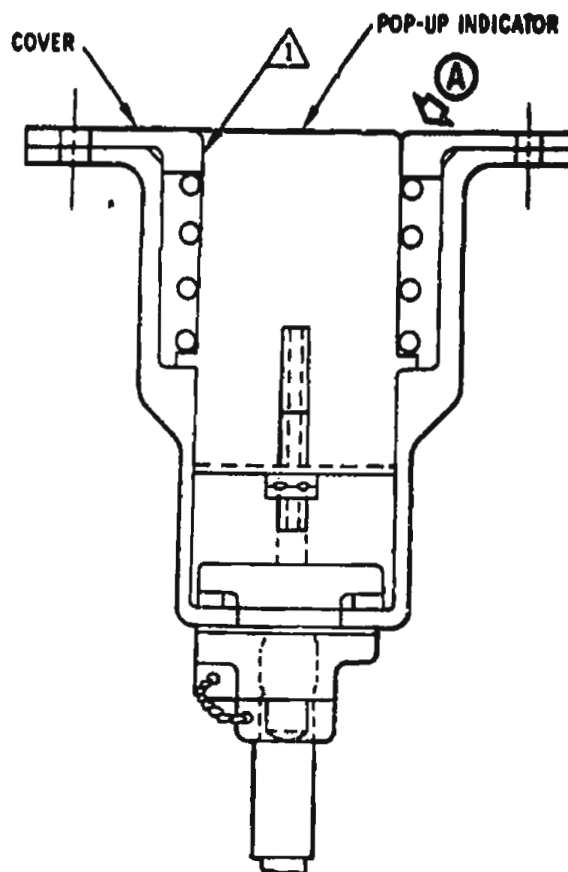
EFFECTIVITY: ALL

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32-61-09

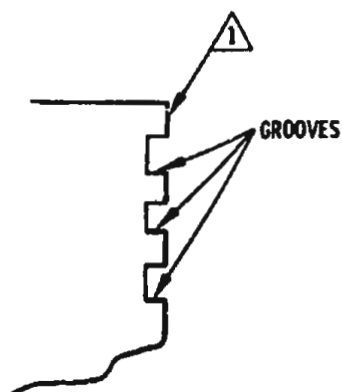
Page 704
Nov 15/88

LOCKHEED
MAINTENANCE MANUAL



PAINT MUST NOT BE APPLIED TO THE
POP-UP INDICATOR OD ADJACENT TO
THE GROOVES OR TO THE ID SURFACE
OF THE COVER

CAUTION



(A)

POP-UP INDICATOR

M1-0101-32-525

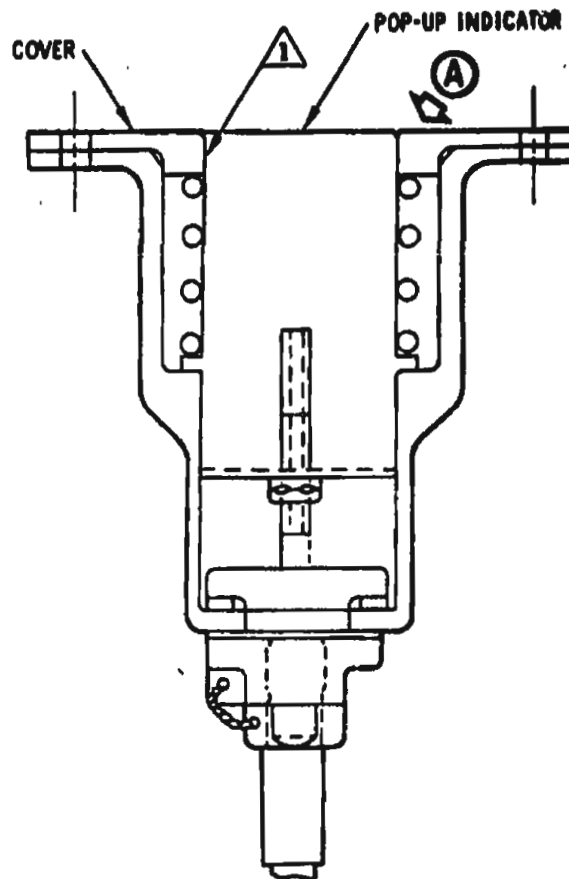
Main Landing Gear Mechanical Downlock Indicator
Cleaning and Painting
Figure 701

R
R
001B

EFFECTIVITY: 001-031 WITHOUT SB32-097

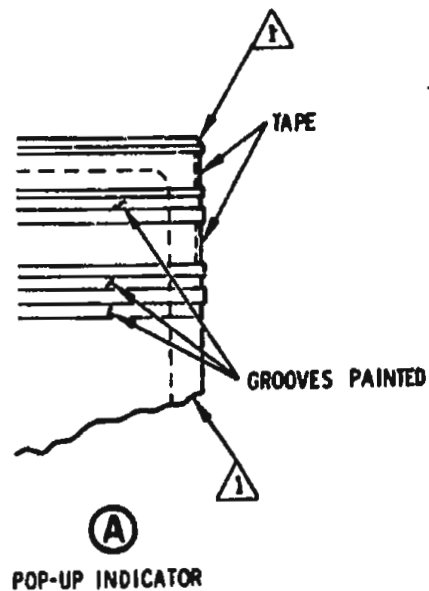
32-61-09
Page 705
Nov 15/88

LOCKHEED
MAINTENANCE MANUAL



CAUTION

1 PAINT MUST NOT BE APPLIED TO THE POP-UP INDICATOR OD ADJACENT TO THE GROOVES OR TO THE ID SURFACE OF THE COVER



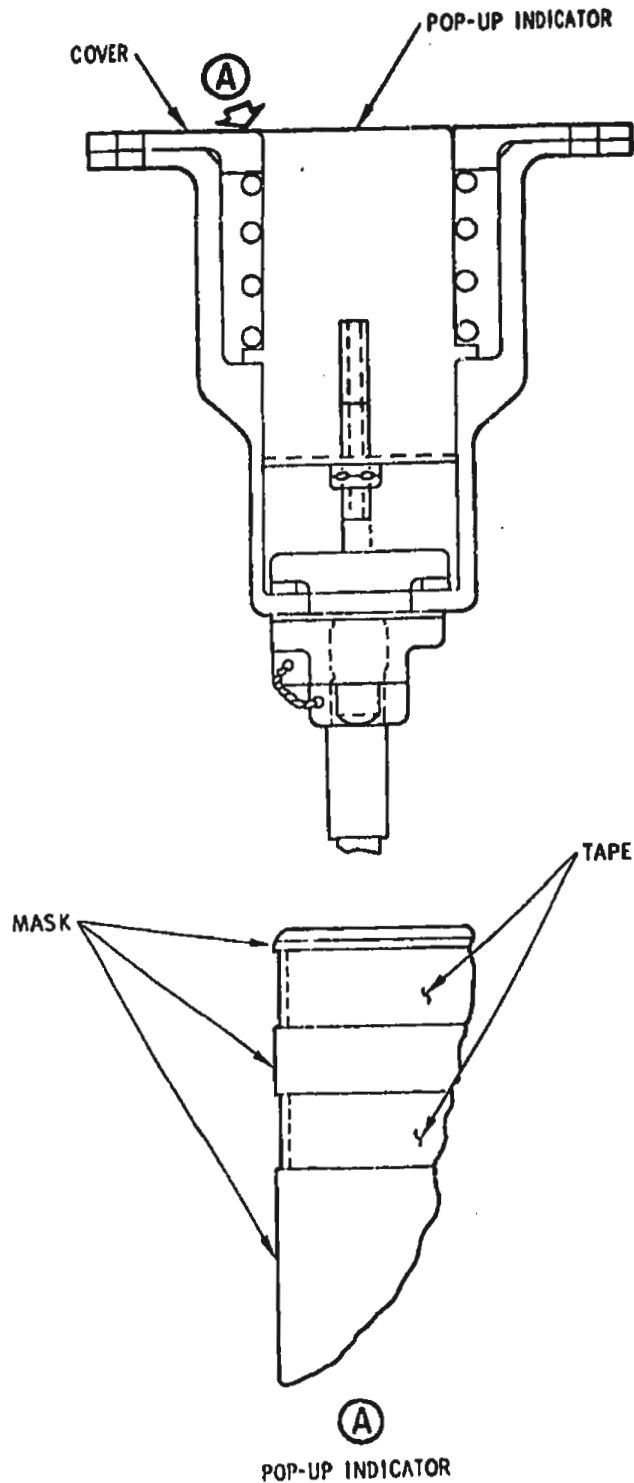
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Main Landing Gear Mechanical Downlock Indicator
Cleaning and Painting
Figure 701

R
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001B EFFECTIVITY: 001-031 WITH SB32-097

32-61-09
Page 706
Nov 15/88

LOCKHEED
MAINTENANCE MANUAL



M1-0001-32-3083

R
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R

Main Landing Gear Mechanical Downlock Indicator
Cleaning and Painting
Figure 701

EFFECTIVITY: 032-999

001B

32-61-09
Page 707/708
Nov 15/89



TAIL SKID POSITION INDICATING SENSOR - REMOVAL AND INSTALLATION

1. General

There are two position indicating sensors. The upper sensor is the tail skid extended sensor, and the lower sensor is the tail skid retracted sensor.

2. Equipment and Materials

Lock-wire, Fed Spec QQ-W-390, 0.020-inch diameter, or equivalent

3. Referenced Procedures

- 26-11-27 No. 2 Engine Vertical Fire Wall Fire Sensor Assembly - Removal and Installation
- 32-61-00 Landing Gear Position Indicating and Warning System - Adjustment and Test
- 71-12-01 LH and RH Lower Hinge Cowls - Servicing

4. Removal/Installation

A. Removal

- (1) On pilots overhead circuit breaker panel CB1, zone 210, open and tag LANDING GEAR DOOR POS IND (L13), PROX SW PWR NO. 1 (L10), PROX SW PWR NO. 4 (L11) and WARN HORN (L12) circuit breakers.
- (2) At rear lower left fuselage, zone 300, open 318AL access panel (Ref. Fig. 401).
- (3) Remove applicable sensor leads from terminal module as follows:

SENSOR	TERMINAL MODULE	WIRE NO./SENSE LEAD
Extend (Upper)	TB402-7-B	3271-25C (RED)
	TB402-8-B	3271-26C (BLUE)
	Ground Stud GS200	32-71-29A-N (YELLOW)
Retract (Lower)	TB402-9-B	3271-27C (RED)
	TB402-10-B	3271-28C (BLUE)
	Ground Stud GS200	3271-30A-N (YELLOW)

EFFECTIVITY: ALL

32-61-12

Page 401
May 15/87

LOCKHEED
MAINTENANCE MANUAL

- (4) Open left and right lower hinged panels (Ref. 71-12-01).
- (5) Remove fire wall fire sensor assembly (Ref. 26-11-27).
- (6) Remove screws securing tail skid shroud to structure. Remove shroud (Ref. Fig. 401).
- (7) Free sensor leads from all ties and clamps.
- (8) Remove bolts securing housing cap to housing.

R

WARNING: HYDRAULIC FLUID AND AIR OR NITROGEN IN THE TAIL SKID ASSEMBLY IS PRESSURIZED. THE PORTS, INTO WHICH THE SENSOR HOUSINGS ARE SECURED, LEAD DIRECTLY INTO THE PRESSURIZED AREA. REMOVAL OF THE SENSOR HOUSINGS WILL RESULT IN UNCONTROLLED RELEASE OF PRESSURIZED HYDRAULIC FLUID AND AIR OR NITROGEN.

- (9) Remove housing cap and sensor. Do not remove housing.
- (10) Remove housing cap from sensor and sensor leads.

B. Installation

- (1) Ensure that circuit breakers opened in Step 4A(1) are opened and tagged.
- (2) Lead sensor leads through housing cap so that cap is fitted over upper portion of sensor.
- (3) Insert sensor into housing, position cap over sensor and housing, and secure with bolts.
- (4) Route sensor leads in same position as those removed.
- (5) Secure leads with clamps and ties.
- (6) Cut sensor leads to required length, strip insulation, and connect to applicable terminal module as follows:

SENSOR	TERMINAL MODULE	WIRE NO./SENSOR LEAD
Extend (Upper)	TB402-7-B	3271-25C (RED)
	TB402-8-B	3271-26C (BLUE)
	Ground Stud GS200	3271-29A-N (YELLOW)
Retract (Lower)	TB402-9-B	3271-27C (RED)
	TB402-10-B	3271-28C (BLUE)
	Ground Stud GS200	3271-30A-N (YELLOW)

EFFECTIVITY: ALL

32-61-12
Page 402
Aug 15/81

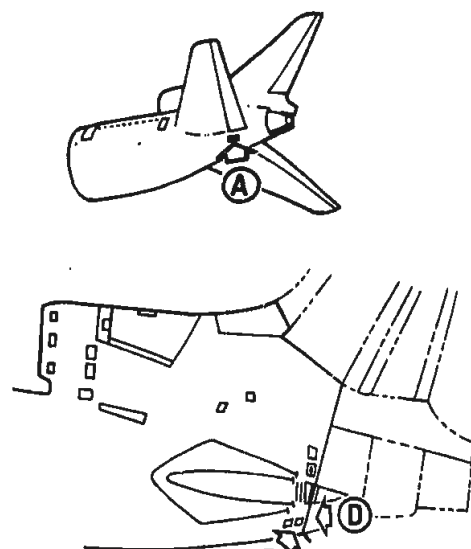
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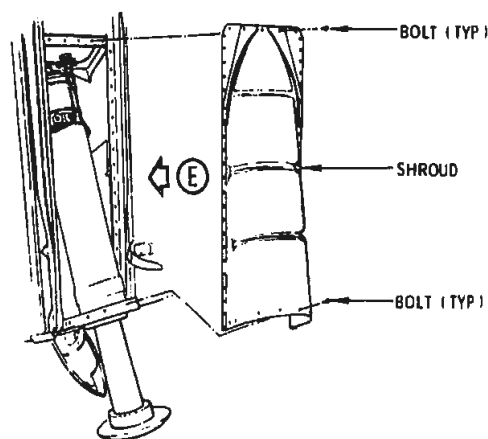


MAINTENANCE MANUAL

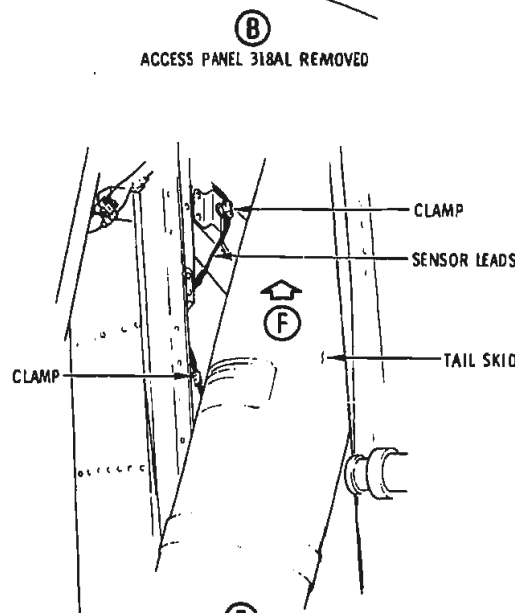
- (7) Remove tags and close circuit breakers opened in Step 4A(1).
- (8) Perform adjustment and test procedure (Ref. 32-61-00).
- (9) Secure sensor housing cap bolts with lock-wire.
- (10) Install tail skid shroud on structure and secure with bolts.
- (11) Install fire wall sensor assembly (Ref. 26-11-27).
- (12) Close left and right lower hinged panels (Ref. 71-12-01).
- (13) Install 318AL access panel.



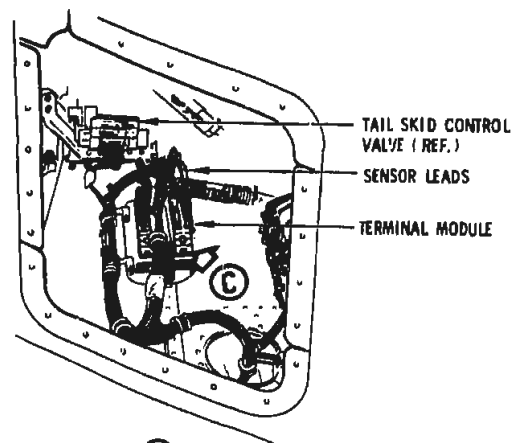
A
LEFT SIDE



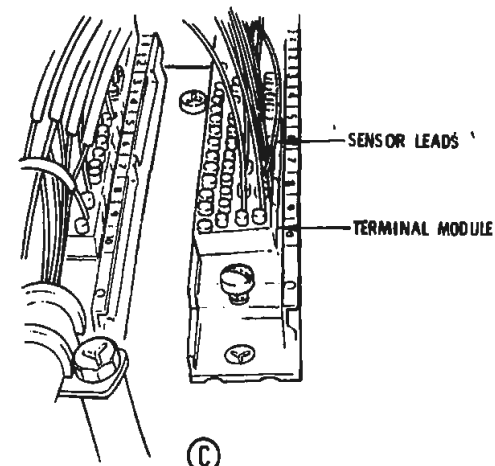
D
SHROUD REMOVAL



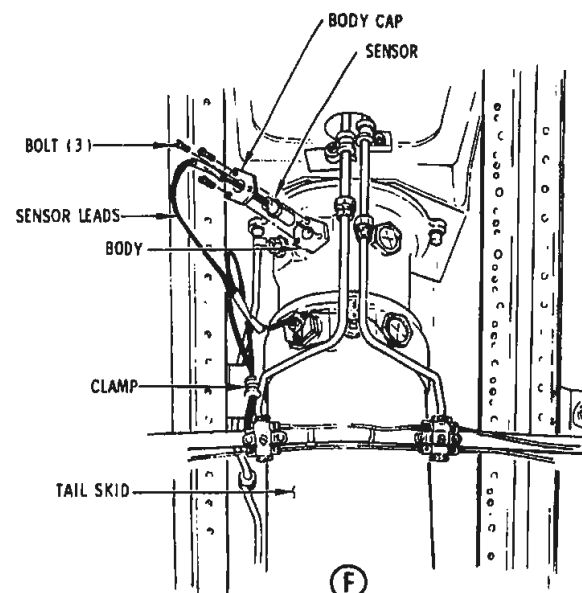
E
SENSOR LEADS



B
ACCESS PANEL 318AL REMOVED



C



F
SENSOR REMOVAL

M1-0100-32-390

R Tail Skid Position Indicating Sensors - Removal and Installation
R Figure 401

32-61-12
Page 405/406
Sep 15/73

EFFECTIVITY: ALL

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001B

AIR/GROUND SENSING SYSTEM - DESCRIPTION AND OPERATION**1. General**

R
R
The air/ground sensing system detects whether the aircraft is on the ground or is airborne. That information is fed to other aircraft systems where it is used to control system operation. The air/ground sensing system includes three sensors and targets on the landing gear assemblies, ten relays, and associated wiring. The system uses certain circuits of the proximity switch logic box and the proximity switch card box (Ref. Fig. 1 and 2). The nose landing gear (NLG) sensor is mounted on the upper torque arm link, zone 711 and the target is secured to the strut cylinder. The main landing gear (MLG) sensors are mounted on the MLG cylinder, and their targets on the upper torque arm, zones 731 and 741. Air/ground sensing relays No. 1, 2, 5, 6, and 8 are installed in the mid electrical service center, zone 137. Air/ground sensing relays No. 3, 4, 7, 10 and the nose gear steering relay are installed in the forward electronic service center, zone 113.

2. Operation

The target is adjacent to the sensor (target-on-sensor) whenever the aircraft is on the ground and the struts are compressed to the normal operating position. In the target-on-sensor condition, the air/ground sensing relays are energized to position them to the ground condition.

Each sensor and the associated switch card in the proximity switch card box form a balanced bridge. Current flow through the sensor coil produces a magnetic field around the sensing surface. When the target is adjacent to the sensor, the magnetic field is varied, producing an impedance change across the sensor coil which unbalances the bridge. The resultant imbalance produces a switch card output which is used to energize the air/ground sensing relays.

In the MLG portion of the system, the switch card output is applied to the proximity switch logic box logic card J11 gate and an inverted output is produced. Either MLG air/ground sensor-switch card circuit, in the ground condition (target-on-sensor), produces a logic 1. Logic box load drivers provide sufficient output to energize air/ground sensing relays 1 through 8 and 10.

In the NLG portion of the system, the switch card output is applied to proximity switch card box driver card J3. Driver

EFFECTIVITY: ALL

0018

32-63-00

Page 1

Jul 15/84

LOCKHEED



MAINTENANCE MANUAL

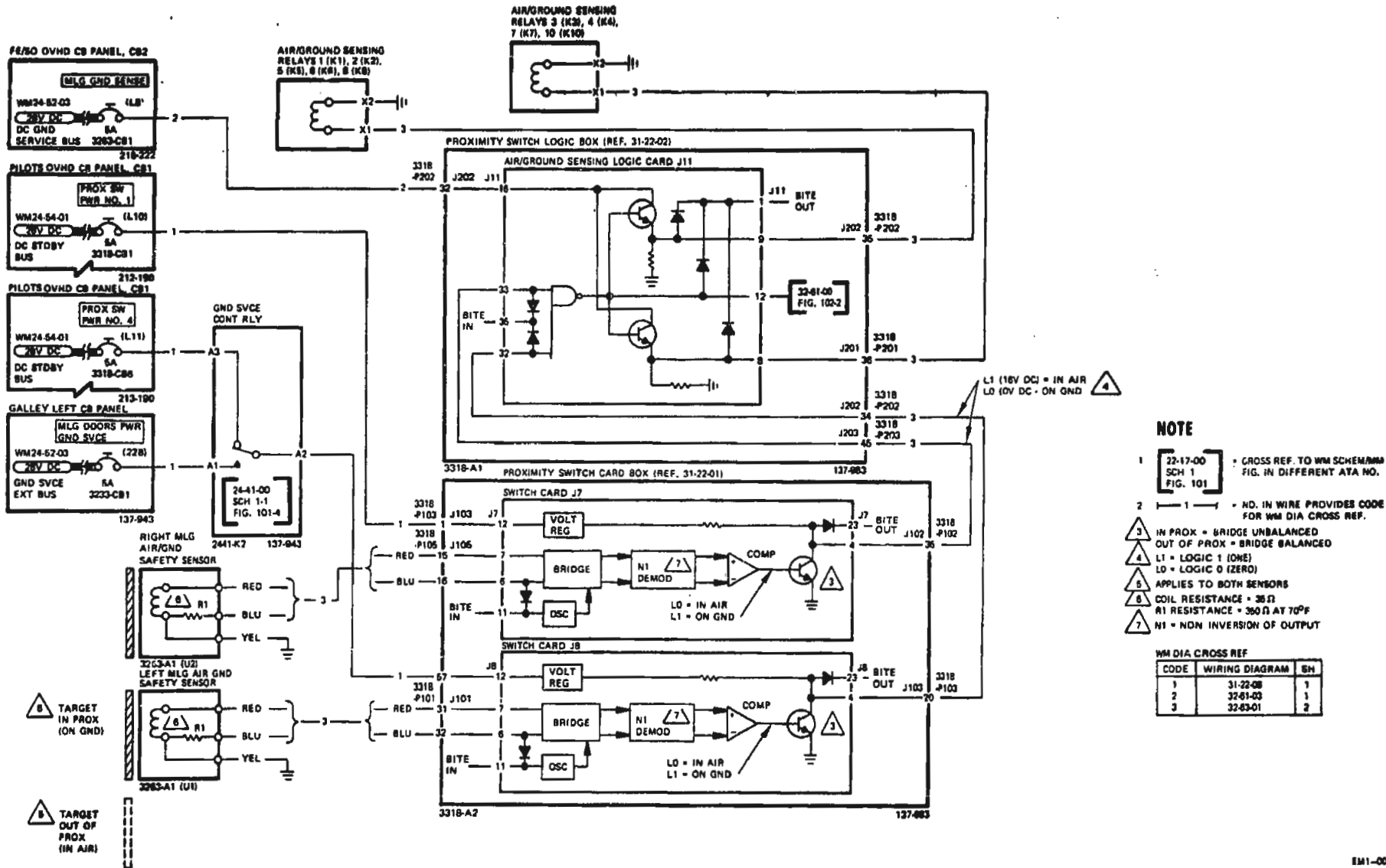
R card J3 acts as a switch to ground, thereby providing a
R completed circuit to energize air/ground sensing relay 9.

EFFECTIVITY: ALL

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32-63-00
Page 2
Nov 15/76

LOCKHEED
MAINTENANCE MANUAL



Main Landing Gear Air/Ground Sensing System
Electrical Schematic Diagram
Figure 1

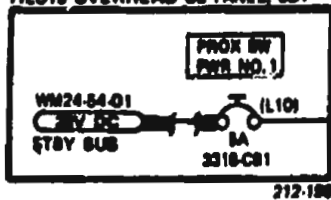
EFFECTIVITY: ALL

32-63-00
Page 3/4
Jul 15/84

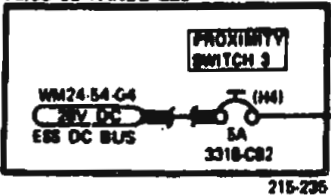
EM1-0006-32-224

LOCKHEED
MAINTENANCE MANUAL

PILOTS OVERHEAD CB PANEL, CB1



FE/SO CB PANEL, CB3



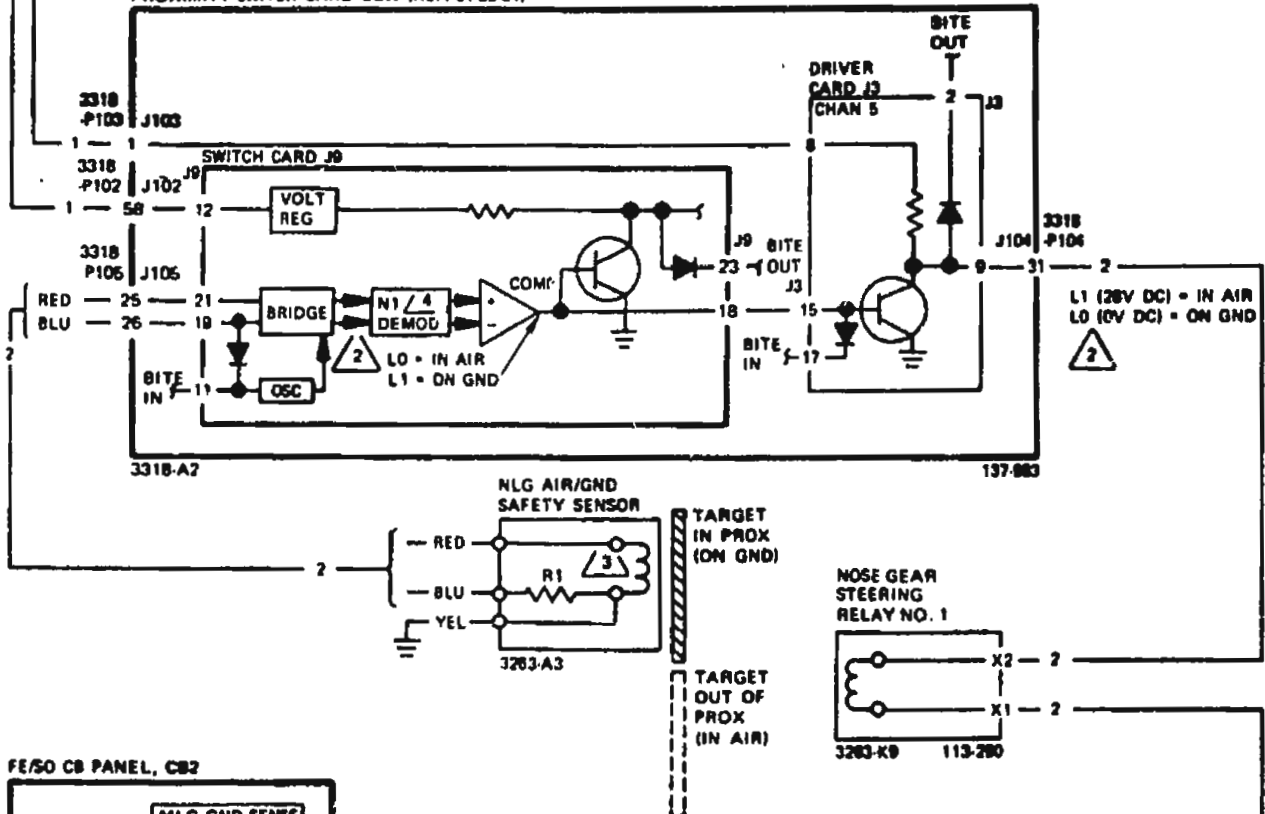
NOTE

- 1 — 1 — = NO. IN WIRE PROVIDES CODE FOR WM DIA CROSS REF.
- 2 L1 = LOGIC 1 (ONE)
L0 = LOGIC 0 (ZERO)
- 3 COIL RESISTANCE = 360
R1 RESISTANCE = 3600 AT 10°F
- 4 N1 = NON INVERSION OF OUTPUT

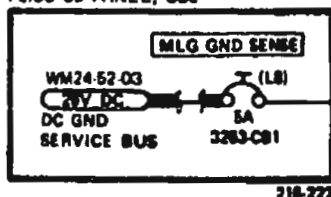
WM DIA CROSS REF.

CODE	WIRING DIA	SH
1	31-22-08	1
2	32-63-02	1

PROXIMITY SWITCH CARD BOX (REF. 31-22-01)



FE/SO CB PANEL, CB2



Nose Landing Gear Air/Ground Sensing System
Electrical Schematic Diagram
Figure 2

EM1-0000-32-2976

R
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R

EFFECTIVITY: ALL

32-63-00
Page 5/6
Jul 15/84

001B

LOCKHEED
MAINTENANCE MANUAL

AIR/GROUND SENSING SYSTEM - FAULT ISOLATION

1. General

Reference data and fault isolation procedures for troubleshooting landing gear system faults are included in this section of the manual. A landing gear system malfunction detected by the flight crew is normally entered in the aircraft flight log book and reported to maintenance personnel by a FIRM fault code number. This number and the flight log book write-up can be found in the Chapter 32 Fault Code Index. The index specifies the maintenance manual section, fault isolation diagram figure number and, where appropriate, a block number indicating the diagram entry point containing the fault isolation procedure. When no block number is specified, the diagram entry point is Block 1.

Prerequisites listed at the top of each diagram identify mandatory preliminary steps and circuit breakers that must be closed before initiating any fault isolation step.

Schematic diagrams, identified by a SCHEM number, supplement fault isolation procedures as maintenance aids. The schematics show the basic system circuitry necessary for troubleshooting and include cross-reference indexes to the wiring diagram manual pages required for checking interconnect wiring.

2. Fault Isolation

Table 101 is a list of fault isolation data in this section of the manual.

Air/Ground Sensing System Fault Isolation
Table 101

FIGURE	TITLE

101	Component Location Index
102	Components Locator Diagram
R 103	Nose Gear Steering Relay Not Energized When Aircraft On Ground
104	Main Landing Gear Air/Ground Sensing Relays Not Energized When Aircraft On Ground
105	Air/Ground Sensing Relays Energized In Air

EFFECTIVITY: ALL

32-63-00
Page 101
Jul 15/84

LOCKHEED



MAINTENANCE MANUAL

Air/Ground Sensing System Fault Isolation (Cont)
Table 101

FIGURE

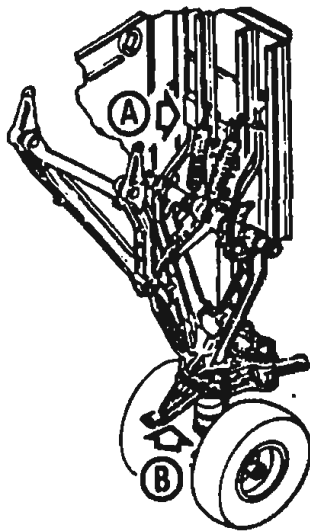
TITLE

SCHEM 1 Air/Ground Sensing System Electrical Schematic

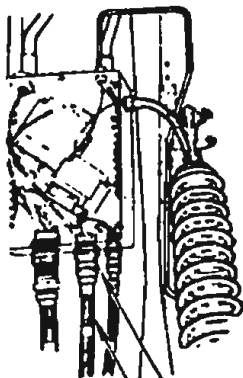
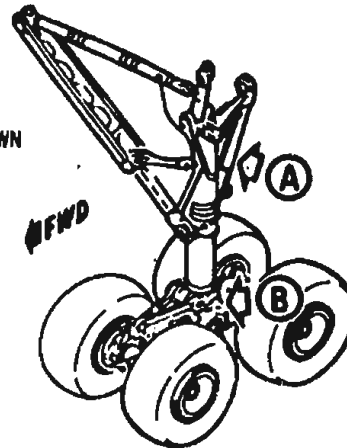
R EFFECTIVITY: ALL
R
001B

32-63-00
Page 102
Aug 15/82

LOCKHEED
MAINTENANCE MANUAL



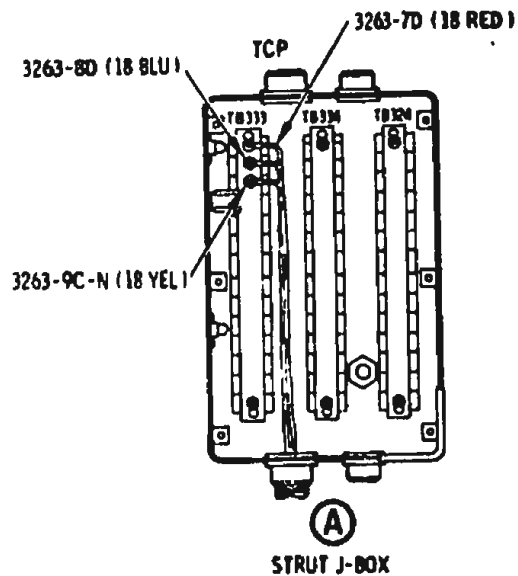
LEFT MAIN GEAR SHOWN
(RIGHT SIMILAR)



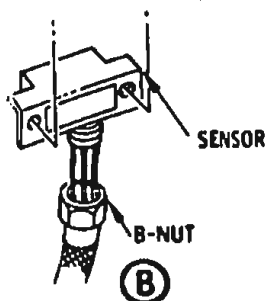
ELECTRICAL CONNECTOR

CONDUIT

(A)



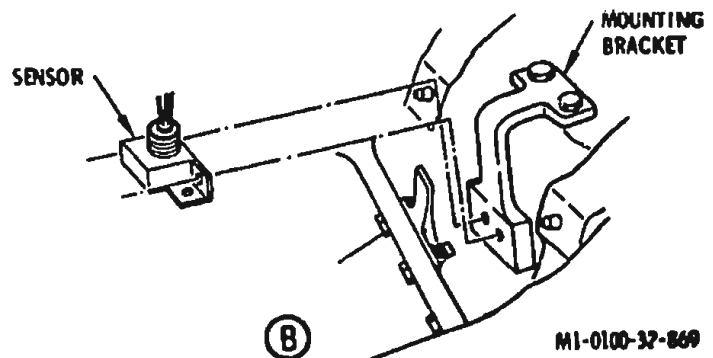
STRUT J-BOX



SENSOR

B-NUT

(B)



SENSOR

MOUNTING
BRACKET

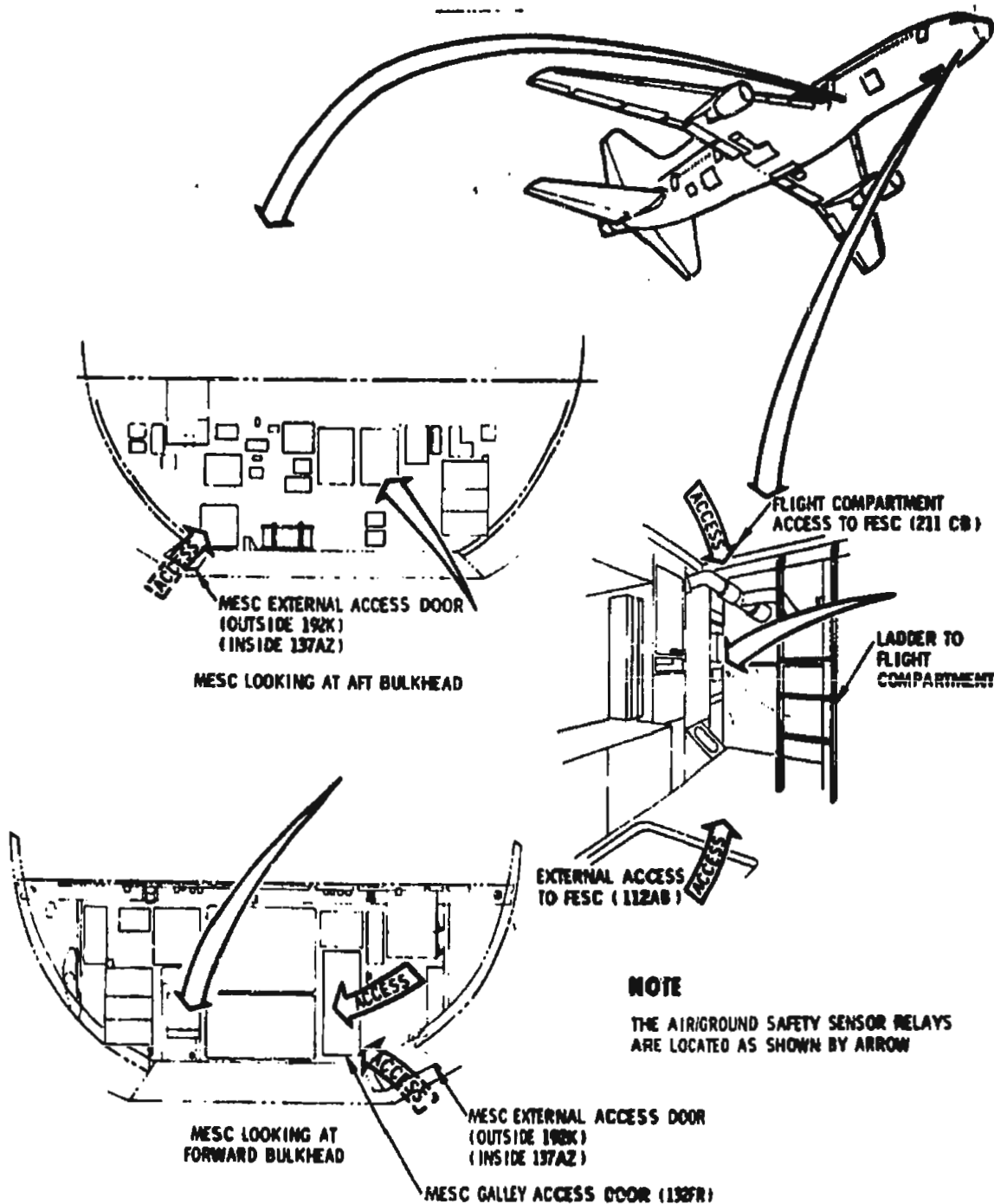
M1-0100-32-869

Air/Ground Safety Sensor Component Location
Figure 102 (Sheet 1)

R EFFECTIVITY: ALL
R
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32-63-00
Page 104
Aug 15/82

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-070

Air/Ground Safety Sensor Component Location
Figure 102 (Sheet 2)

R EFFECTIVITY: ALL
R
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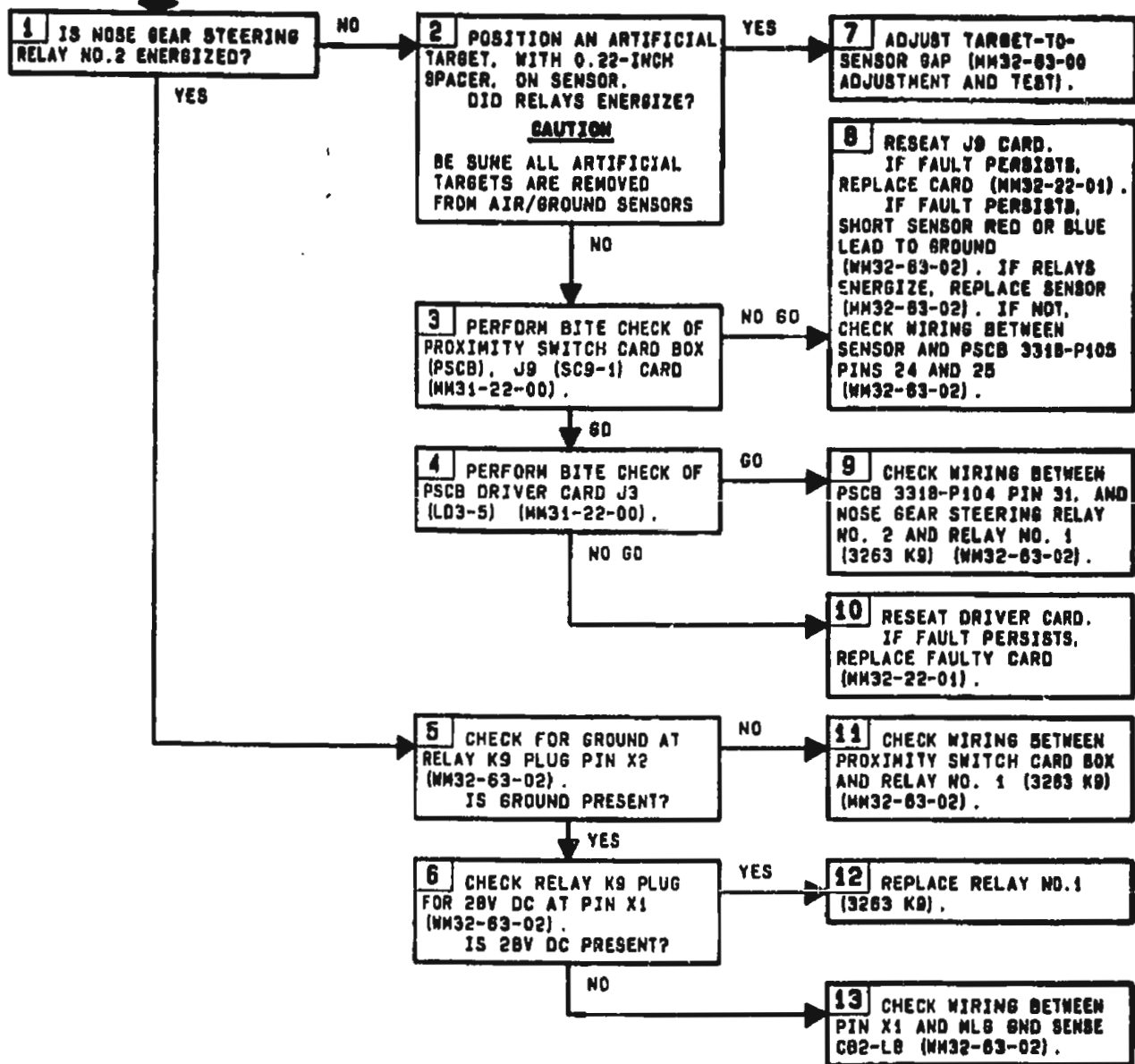
32-63-00
Page 105
Aug 15/82

LOCKHEED
MAINTENANCE MANUAL



PREREQUISITES
ELECTRICAL POWER ON (MM34-00-00)
CB'S IN: C82-L8; C83-M4

**NOSE GEAR STEERING
RELAY NO. 1 NOT
ENERGIZED ON GROUND**



NI-0000-11-0070

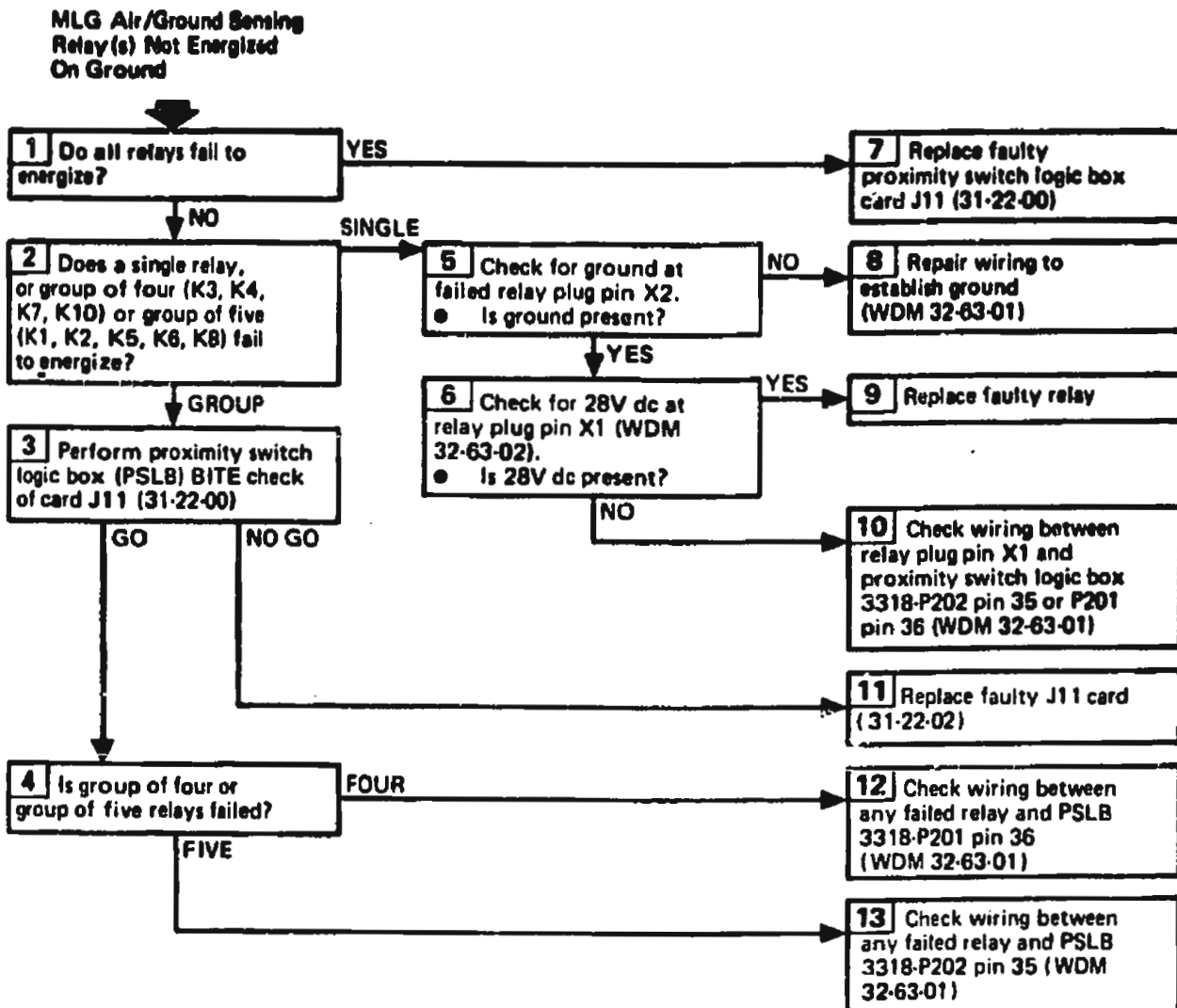
R Nose Gear Steering Relay Not Energized When Aircraft On Ground
R Figure 103

EFFECTIVITY: ALL

32-63-00
Page 106
Jul 15/84

001B

LOCKHEED
MAINTENANCE MANUAL



PREREQUISITES

Electrical Power on (24-00-00)
CB's in: CB1-L10, L11
CB2-L8
Galley left - 22B

M1-0100-32-053

Main Landing Gear Air/Ground Sensing Relays Not
Energized On Ground
Figure 104

R
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EFFECTIVITY: ALL

32-63-00
Page 107
Aug 15/82

LOCKHEED



MAINTENANCE MANUAL

PREREQUISITES

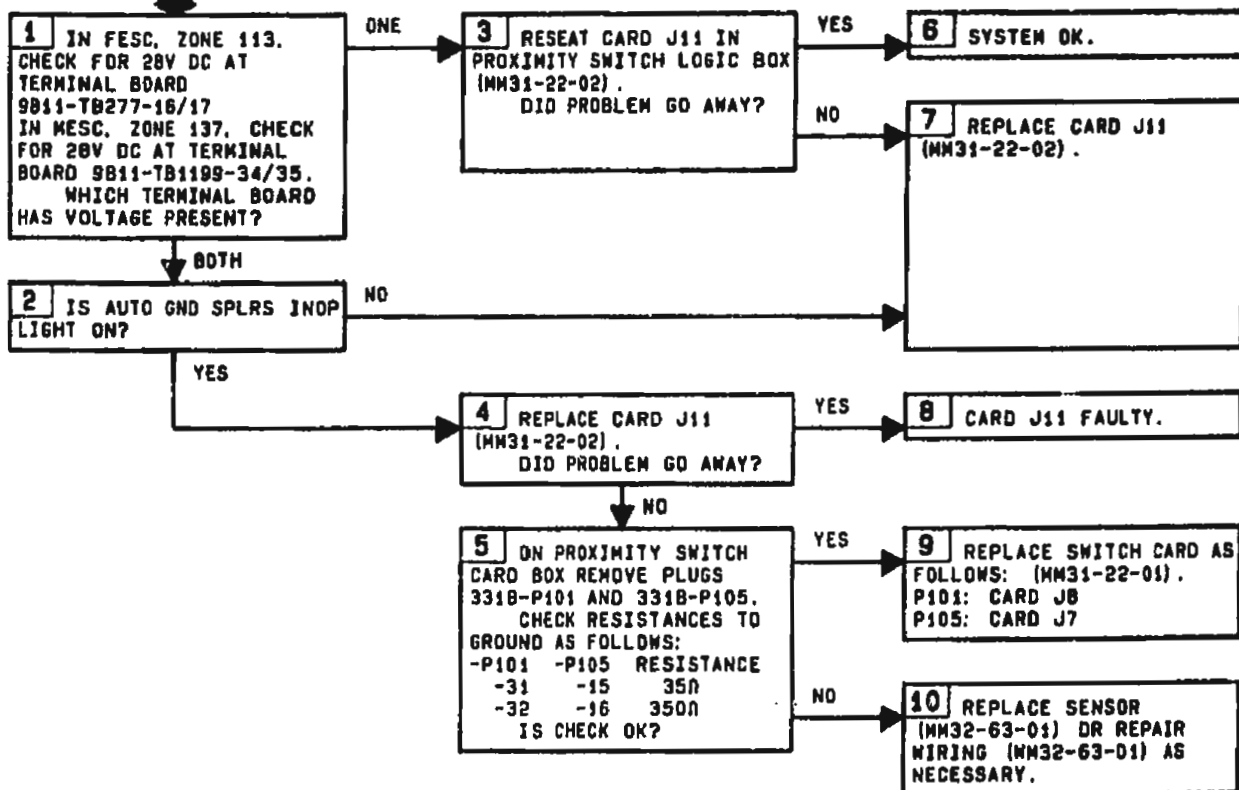
ELECTRICAL POWER ON (MM24-00-00)
CB'S IN: CB1-L10, L11
CB2-L8
CB3-H8, H4
OL-B22

WARNING

VERIFY LANDING GEAR DOWNLOCK
SAFETY PINS, DOOR SAFETY
DEVICES AND RAT GROUND SAFETY
LOCK ARE INSTALLED.

PLACE AIRCRAFT IN AIRBORNE MODE
(MM32-63-00, MAINTENANCE PRACTICES)

MLG AIR/GROUND SYSTEM ENERGIZED IN AIR



MI-0001-32-788

R
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Air/Ground Sensing Relays
Energized In Air (MLG)
Figure 105 (Sheet 1)

EFFECTIVITY: ALL

001B

32-63-00
Page 108
Nov 15/84

LOCKHEED



MAINTENANCE MANUAL

PREREQUISITES

ELECTRICAL POWER (MM24-00-00)

CB'S IN: CB1-L10, L11

CB2-L8

CB3-H3, H4

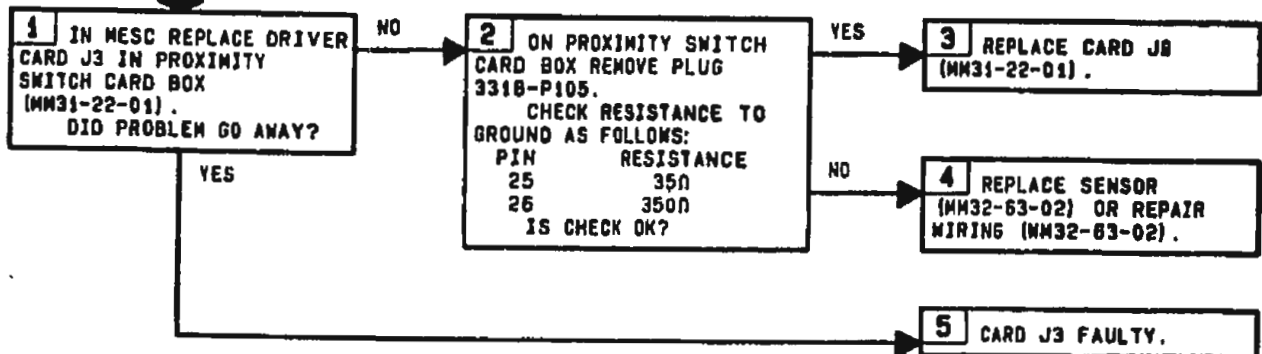
OL-B22

WARNING

VERIFY LANDING GEAR DOWNLOCK
PINS, DOOR SAFETY DEVICES
AND RAT GROUND SAFETY LOCK
ARE INSTALLED.

PLACE AIRCRAFT IN AIRBORNE MODE
(MM32-63-00, MAINTENANCE PRACTICES)

NLG AIR/GROUND SYSTEM ENERGIZED IN AIR



M1-0000-38-2000

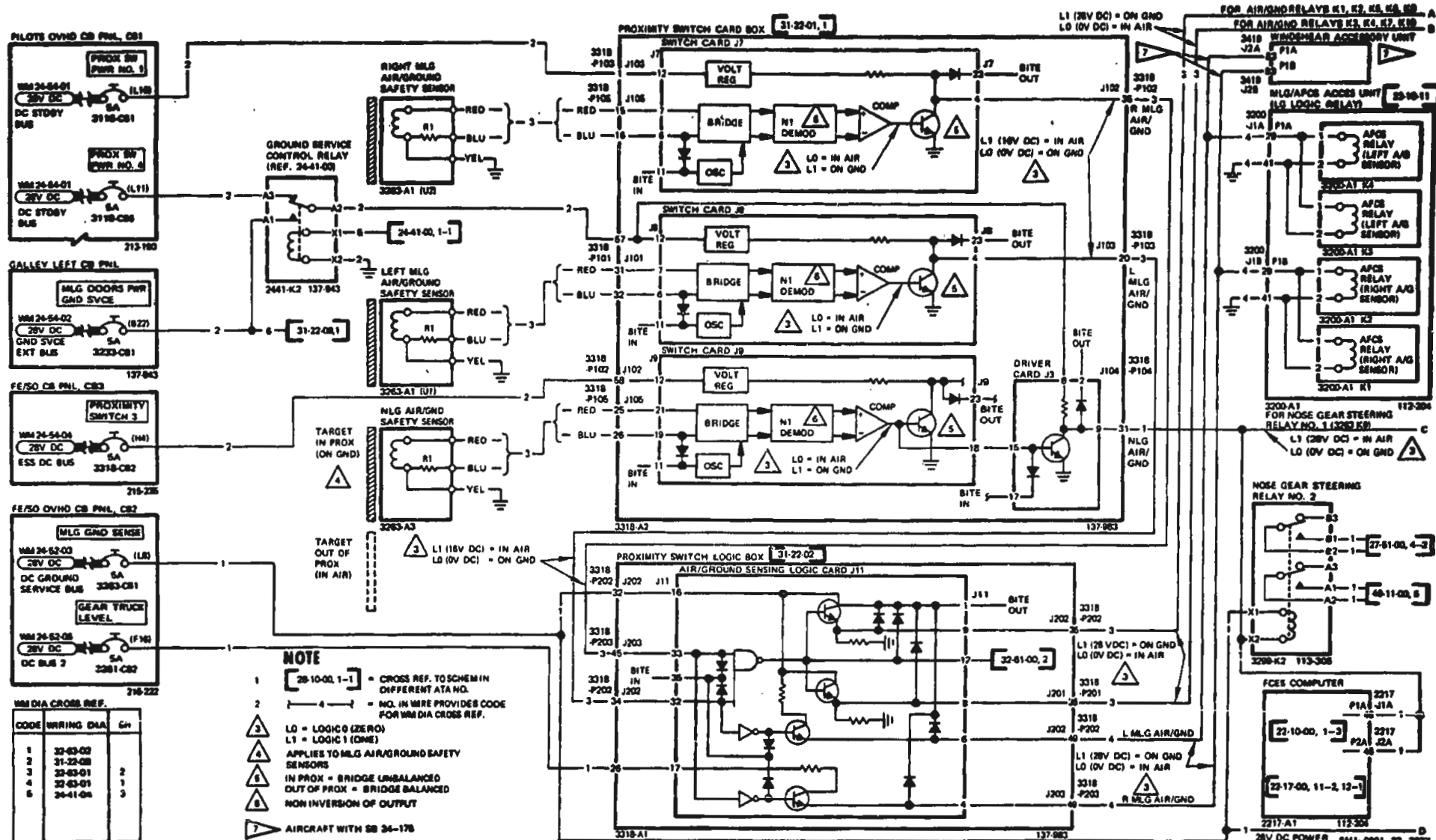
Air/Ground Sensing Relays
Energized In Air (NLG)
Figure 105 (Sheet 2)

EFFECTIVITY: ALL

32-63-00
Page 109/110
Nov 15/84

001B

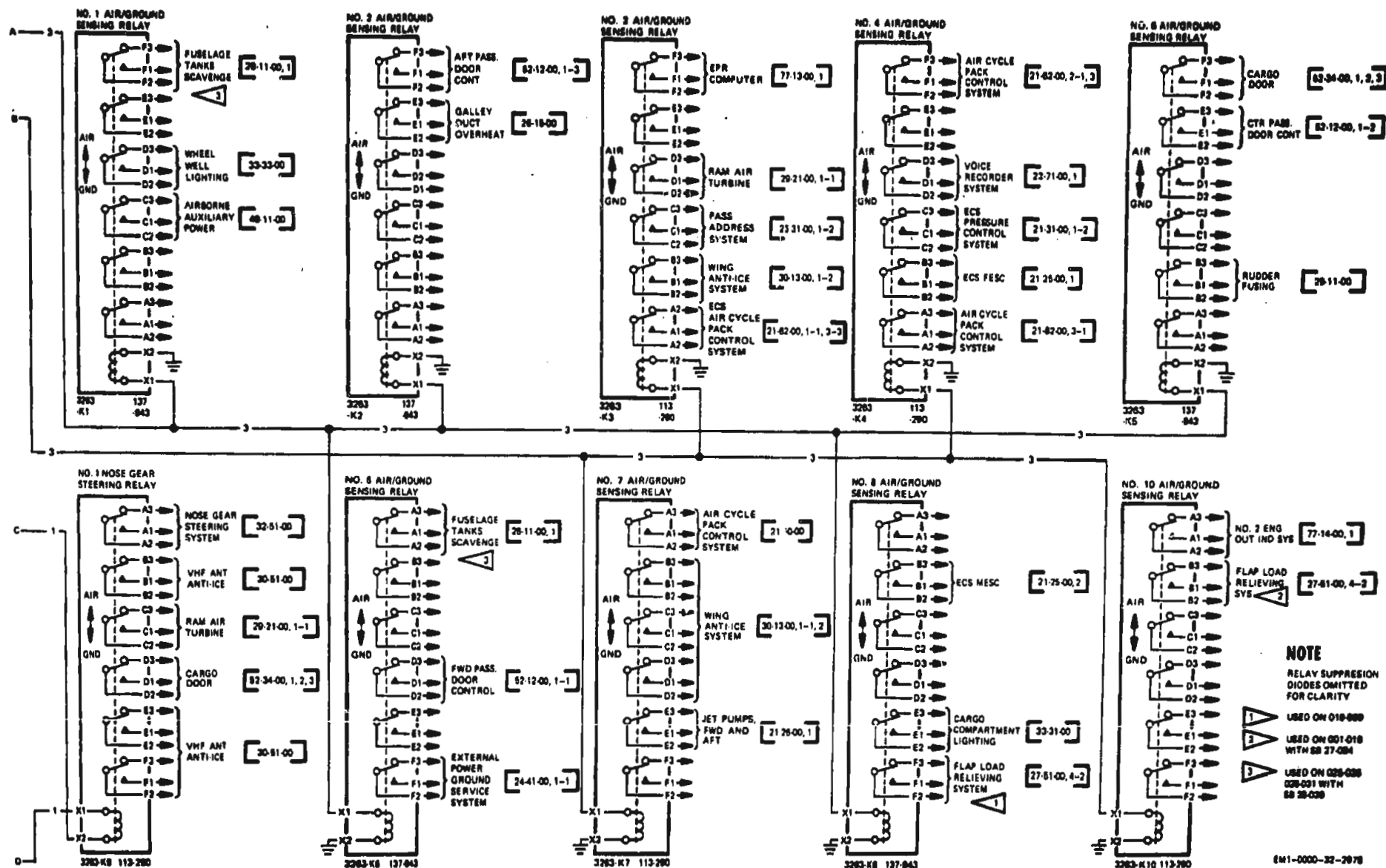
R
R
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Air/Ground Sensing Electrical Schematic
SCHEM 1 (Sheet 1)

EFFECTIVITY: ALL

32-63-00
Page 111/112
Mar 15/91



Air/Ground Sensing System Electrical Schematic
SCHEM 1 (Sheet 2)

32-63-00
Page 113/114
Nov 15/84

LOCKHEED
MAINTENANCE MANUAL

AIR/GROUND SENSING - MAINTENANCE PRACTICES

1. General

This procedure simulates an aircraft airborne condition by placing 0.050-inch thick aluminum shims between the air/ground sensor and the target on both main and nose landing gears.

2. Equipment and Materials

Aluminum shim 0.050-inch thick with safety streamer (3 required)
RAT Ground Safety Lock - P/N 1304565

3. Referenced Procedures

10-10-00 Parking - Maintenance Practices
24-00-00 Electrical Power - Maintenance Practices
29-21-00 Ram Air Turbine - Maintenance Practices

4. Maintenance Practices

A. Aircraft Airborne Simulation Procedure

- (1) Turn on electrical power (Ref. 24-00-00).
- R (2) On Flight Engineer/Second Officers overhead circuit
R breaker panel CB2, zone 210, ensure that circuit
R breaker MLG GRD SENSE (L8) is closed. Open and tag
circuit breakers BAT CHG INTLK (L6) and RUD FUS SYS
(L16).
- R (3) On Flight Engineer/Second Officers aft circuit breaker
R panel CB3, zone 210, ensure that circuit breakers
PROXIMITY SWITCH 2 (H3) and (H4) are closed.
- R (4) On Pilots overhead circuit breaker panel CB1, zone 210,
R ensure that PROX SW PWR NO. 1 (L10) and NO. 4 (L11)
circuit breakers are closed. Open and tag circuit
breakers ENVIR CONTROL SYSTEM MANUAL CABIN PRESS FWD
(H1) and AFT (H2) AIR OVBD (J14), and RAT AUTO DEPLOY
(L3).
- R (5) On Pilots overhead FCES control panel, depress DLC/AUTO
SPLR NO. 1 and NO. 2 switchlight to OFF and tag.

EFFECTIVITY: ALL

0018

32-63-00
Page 201
Nov 15/81



- R (6) Install RAT ground safety lock (Ref. 29-21-00).
- R (7) Ensure that landing gear downlock safety pins are installed (Ref. 10-10-00).
- R (8) On right main landing gear, place aluminum shim between air/ground (weight on wheel(s) safety sensor and target.
- R (9) On left main landing gear, place aluminum shim between air/ground safety sensor and target.
- R (10) On nose landing gear, place aluminum shim between air/ground safety sensor and target.

B. Return to On-Ground Procedure

CAUTION: BE SURE ALL ARTIFICIAL TARGETS ARE REMOVED FROM AIR/GROUND SENSORS.

- (1) Remove aluminum shims from NLG, right MLG, and left MLG.
- (2) Remove RAT ground safety lock (Ref. 29-21-00).
- R (3) On Pilots overhead circuit breaker panel CB1, remove tags and close circuit breakers ENVIR CONTROL SYSTEM MANUAL CABIN PRESS FWD (H1) and AFT (H2) AIR OVBD (J14), and RAT AUTO DEPLOY (L3).
- R (4) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, remove tags and close circuit breakers BAT CHG INTLK (L6) and RUD FUS SYS (L16).
- R (5) On Pilots overhead FCES control panel, depress DLC/AUTO SPLR NO. 1 and NO. 2 switchlight to ON and remove tag.
- (6) Turn off electrical power (Ref. 24-00-00).

LOCKHEED
MAINTENANCE MANUAL

AIR/GROUND SENSING SYSTEM - ADJUSTMENT AND TEST

1. General

This procedure tests the system from the nose landing gear and main landing gear air/ground safety sensors to the circuits which power the nine air/ground sensing relays. An on-the-ground condition is normal and exists when the weight of the aircraft is on all three landing gears. An airborne condition is simulated by shading the sensor (placing an aluminum shim between the sensor and target).

2. Equipment and Materials

- R Sensor shade (aluminum shim 0.050 inch thick)(Ref. 20-31-01)
- R Artificial target (steel shim 0.050 inch thick)(Ref. 20-31-01 and G/ITEL 32-61-06)

3. Referenced Procedures

- R 20-31-01 Proximity Sensor Target - Maintenance Practices
- 24-41-00 External Power System - Maintenance Practices
- 31-22-00 Proximity Switch Card Box and Proximity Logic Box - Maintenance Practices
- 33-33-00 Wheel Well Lighting - Adjustment and Test
- 52-34-00 Cargo Door Actuation System - Adjustment and Test
- R G/ITEL
- R 32-61-06 Artificial Target, Local Manufacture

4. Adjustment/Test

A. Adjustment

- (1) Turn on external power as required (Ref. 24-00-00).
- (2) On Flight Engineer/Second Officers circuit breaker panel CB2, ensure that MLG GND SENSE, and EXTERIOR LT - WHEEL WELL LT - CONT (K1) and PWR (K2) circuit breakers are closed. Open and tag BAT CHG INTLK (L6).

EFFECTIVITY: ALL

001B

32-63-00
Page 501
May 15/86



MAINTENANCE MANUAL

- (3) On Flight Engineer/Second Officers circuit breaker panel CB3, ensure that PROX SW PWR NO. 3 (H4) circuit breaker is closed.
- (4) If external power is used, on galley left circuit breaker panel, ensure that MLG DOORS PWR - GND SVCE (B22) circuit breaker is closed.
- (5) On pilots overhead circuit breaker panel CB1, ensure that PROX SW PWR NO. 1 (L10) circuit breaker is closed; and if external power is not used, ensure that PROX SW PWR NO. 4 (L11) is closed. Open and tag ENVIR CONTROL SYSTEM MANUAL CABIN PRESS FWD (H1) and AFT (H2) AIR OVBD (J14), and RAT AUTO DEPLOY (L3) circuit breakers.
- (6) On pilots overhead FCES control panel, depress and tag DLC/AUTO SPLR NO. 1 and NO. 2 switchlights to OFF (OFF light on).
- (7) Install RAT ground safety lock (Ref. 29-21-00).
- (8) Ensure that landing gear downlock safety pins are installed.
- (9) At applicable main landing gear wheel well, turn on wheel well lights (Ref. 33-33-00). Lights must come on.

CAUTION: ENSURE THAT CIRCUIT BREAKERS OPENED IN STEPS 4A(2) AND (5) ARE OPEN, THAT SWITCHLIGHTS DEPRESSED IN STEP 4A(6) ARE OFF, AND THAT RAT GROUND SAFETY LOCK IS INSTALLED.

- (10) If lights do not come on, place artificial targets between MLG air/ground sensors and targets. Target must not touch sensor; use plastic spacer between shim and sensor. Lights must come on.
- (11) Remove artificial targets, one at a time, so that only one target is removed at any one time.
- (12) If artificial target is required to obtain a lights-on condition, adjust the applicable sensor-to-target gap as follows:

CAUTION: BE SURE ALL ARTIFICIAL TARGETS ARE REMOVED FROM AIR/GROUND SENSORS. INADVERTENTLY LEAVING THE ARTIFICIAL TARGET IN THE SYSTEM AFTER THE TEST MAY POSE OPERATIONAL AND SAFETY HAZARDS.

- (a) Remove both artificial targets.

EFFECTIVITY: ALL

LOCKHEED
MAINTENANCE MANUAL

(b) Loosen bolts mounting sensor to strut.

(c) Place shims between sensor and strut until gap between sensor and target is 0.125 to 0.250 inch. Light must come on. If light does not come on, reduce gap until light comes on. Gap dimension must not be less than 0.125 inch.

(d) Tighten mounting bolts.

(13) Insert a sensor shade between applicable sensor and target. Lights must go off. Remove shade.

CAUTION: BE SURE ALL SHADES ARE REMOVED FROM AIR/GROUND SENSORS. INADVERTENTLY LEAVING THE ARTIFICIAL TARGET IN THE SYSTEM AFTER THE TEST MAY POSE OPERATIONAL AND SAFETY HAZARDS.

(14) Turn off wheel well lights (Ref. 33-33-00).

(15) At nose landing gear, if torque arms are disconnected, position upper torque arm in a slightly lower than horizontal position.

(16) Operate forward cargo door (Ref. 52-34-00).

(17) If door will not operate, place an artificial target between nose landing gear air/ground sensor and target. Artificial target must not touch sensor. Door must operate.

CAUTION: BE SURE ALL ARTIFICIAL TARGETS ARE REMOVED FROM AIR/GROUND SENSORS. INADVERTENTLY LEAVING THE ARTIFICIAL TARGET IN THE SYSTEM AFTER THE TEST MAY POSE OPERATIONAL AND SAFETY HAZARDS.

(18) If artificial target is required to operate cargo door, remove artificial target and adjust sensor-to-target gap as follows:

(a) Loosen bolts mounting sensor to bracket.

(b) Place shims between sensor and bracket until gap between sensor and target is 0.100 to 0.250 inch. Cargo door must operate. If cargo door does not operate, reduce gap until door operates. Gap dimension must not be less than 0.100 inch.

(c) Tighten mounting bolts.

EFFECTIVITY: ALL

32-63-00
Page 503
May 15/86

001B



- (19) Insert a sensor shade between sensor and target. Cargo doors must not operate. Remove shim.

CAUTION: BE SURE ALL ARTIFICIAL TARGETS ARE REMOVED FROM AIR/GROUND SENSORS. INADVERTENTLY LEAVING THE ARTIFICIAL TARGET IN THE SYSTEM AFTER THE TEST MAY POSE OPERATIONAL AND SAFETY HAZARDS.

R
R
R

- (20) Remove sensor shade.
- (21) Secure cargo door operation (Ref. 52-34-00) and turn off wheel well lights.
- (22) Turn on switchlights turned off in Step 4A(6).
- (23) Turn off external power as required (Ref. 24-41-00).
- (24) Remove tags and close circuit breakers opened in Steps 4A(2) and (5).
- (25) Remove RAT ground safety lock (Ref. 29-21-00).

EFFECTIVITY: ALL

001B

32-63-00

Page 504
May 15/86

LOCKHEED
MAINTENANCE MANUAL

R MAIN_LANDING_GEAR_AIR/GROUND_SAFETY_SENSOR
R REMOVAL_AND_INSTALLATION

R 1. Equipment_and_Materials

R Talcum powder

R Lock-wire, Fed Spec QQ-W-390, 0.042-inch diameter, or equivalent

R 2. Referenced_Procedures

R 32-33-00 Main Landing Gear Inboard Door - Maintenance
R Practices

R 32-63-00 Air/Ground Sensing System - Adjustment and Test

R 3. Removal/Installation

R A. Removal

R (1) At pilots overhead circuit breaker panel CB1, zone 210,
R open and tag circuit breakers PROX SW PWR NO. 1 (L10)
R and PROX SW PWR NO. 4 (L11).

R At Flight Engineer/Second Officers overhead circuit
R breaker panel CB2, zone 215, open and tag circuit
R breaker MLG GND SENSE (L8).

R At galley left circuit breaker panel, zone 131, open
R and tag circuit breaker MLG DOORS PWR GRND SVCE (22B)
R circuit breaker.

R (2) Open applicable main landing gear (MLG) inboard door
R and install inboard door actuator lock (Ref. 32-33-00).

R (3) Open MLG strut J-box, zone 731 or 741 (Ref. Fig. 401).

R (4) Disconnect from terminal strip TB333, posts 1, 2, and
R 3, the following wires:

R (a) Post 1, 3263-7D (18 RED)

R (b) Post 2, 3263-8D (18 BLU)

R (c) Post 3, 3263-9C-N (18 YEL)

R (5) Remove terminal lugs from wires and attach pull-wire.

R EFFECTIVITY: ALL
R

001B

32-63-01
Page 401
Nov 15/76

LOCKHEED
MAINTENANCE MANUAL

- R (6) Disconnect B-nut from sensor.
- R (7) Remove bolts and nuts securing sensor to mounting
R bracket.
- R (8) Withdraw wires from conduit at sensor end while feeding
R pull-wire into conduit at J-box.
- R (9) When sensor wires are clear of conduit, disconnect
R sensor wires from pull-wire. Leave pull-wire in
R conduit.

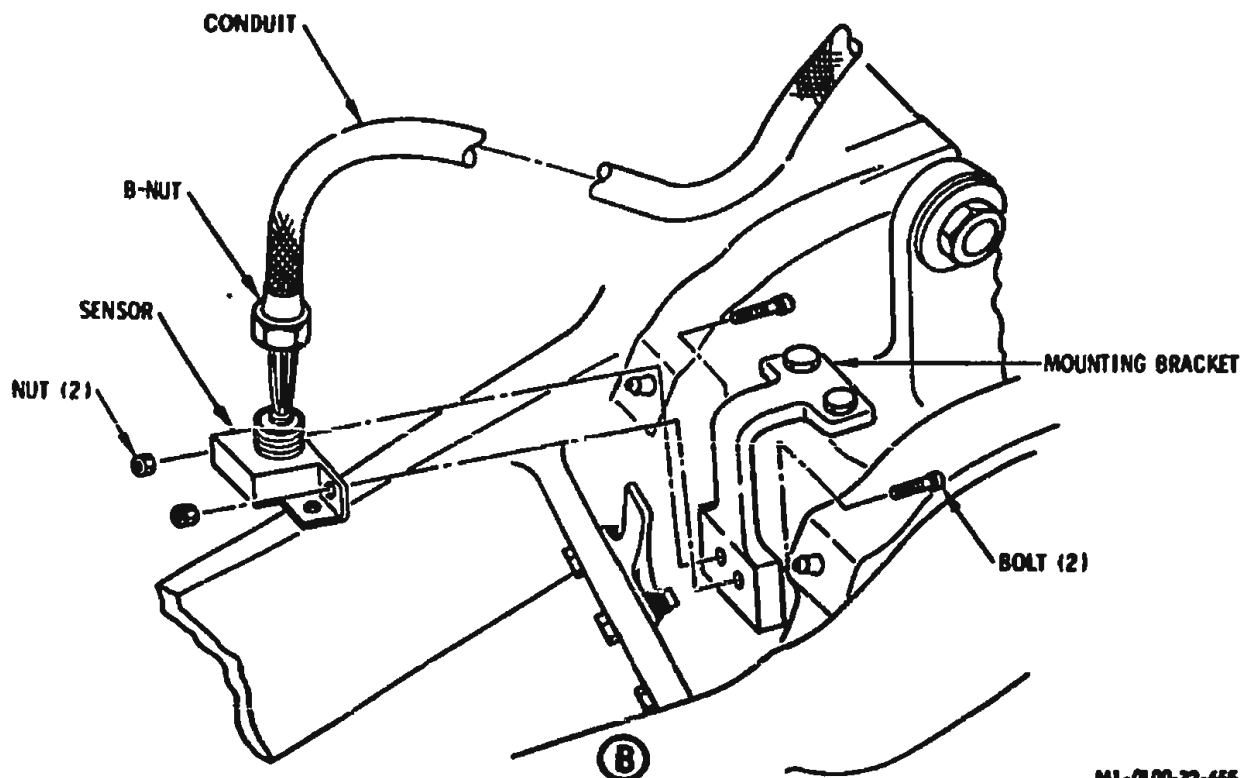
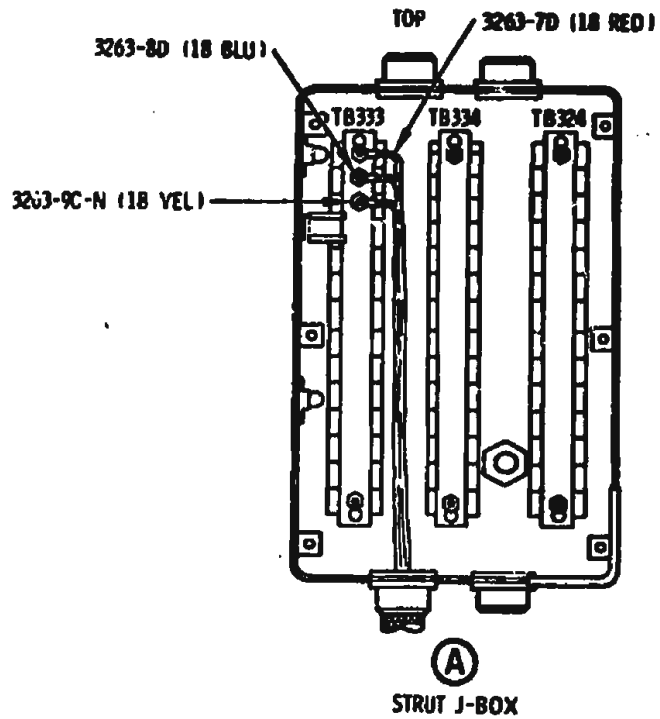
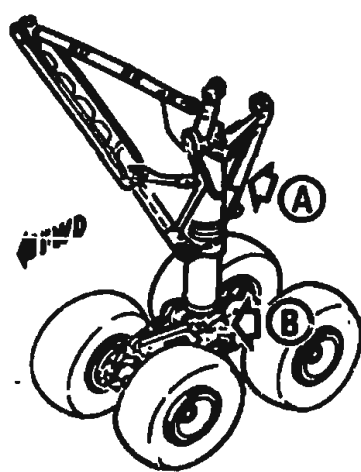
R B. Installation

- R (1) Verify that circuit breakers opened in Step (1) are
R open and tagged.
- R (2) Lubricate sensor wires with talcum powder.
- R (3) Connect sensor wires to pull-wire.
- R (4) Pull wires through conduit until B-nut is snug against
R sensor.
- R (5) Secure sensor to mounting bracket using bolts and nuts.
- R (6) Secure B-nut to sensor.
- R (7) Disconnect pull-wire from sensor wires.
- R (8) Cut sensor wires to correct length and crimp terminal
R lugs to wires.
- R (9) Secure terminal lugs to terminal posts as follows:
- R (a) Post 1, 3263-7D (18 RED)
- R (b) Post 2, 3263-8D (18 BLU)
- R (c) Post 3, 3263-9C-N (18 YEL)
- R (10) Secure B-nut to sensor with lock-wire.
- R (11) Remove tags and close circuit breakers opened in Step
R (1).
- R (12) Perform MLG air/ground sensor adjustment and test
R (32-63-00).
- R (13) Close MLG strut J-box.
- R (14) Close MLG inboard door (Ref. 32-33-00).

R EFFECTIVITY: ALL
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0018

32-63-01
Page 402
Nov 15/76

LOCKHEED
MAINTENANCE MANUAL



MI-0100-32-455

MLG Air/Ground Safety Sensor
Removal and Installation
Figure 401

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EFFECTIVITY: ALL

32-63-01
Page 403/404
Nov 15/76

001B

LOCKHEED
MAINTENANCE MANUAL

R NOSE_LANDING_GEAR_AIR/GROUND_SAFETY_SENSOR
R REMOVAL_AND_INSTALLATION

R 1. Equipment_and_Materials

- R Lock-wire, Fed Spec QQ-W-390, 0.042-inch diameter, or equivalent
R Lock-wire, Fed Spec QQ-W-390, 0.025-inch diameter, or equivalent

R 2. Referenced_Procedures

- R 20-21-00 Wiring Diagram Manual - Assembly and Maintenance of
R Electrical Connectors
R 32-63-00 Air/Ground Sensing System - Adjustment and Test

R 3. Removal/Installation

R A. Removal

- R (1) On Flight Engineer/Second Officers aft circuit breaker
R panel CB3, zone 215, open and tag circuit breaker
R PROXIMITY SWITCH 3 (H3).
R (2) Disconnect electrical connector at J-box (Ref. Fig.
R 401).
R (3) Disconnect sensor wires from connector pins 1, 2, and 3
R (Ref. WDM 20-21-00) and secure pull-wire, longer than
R conduit, to sensor wires.
R (4) At sensor, loosen B-nut and disconnect rigid conduit
R from sensor.
R (5) Remove nuts and bolts, then remove sensor from upper
R torque arm link.
R (6) Pull sensor wires out of conduit. Ensure that
R pull-wire is drawn into conduit.
R (7) Disconnect sensor wires from pull-wire.
R (8) Remove sensor.

R B. Installation

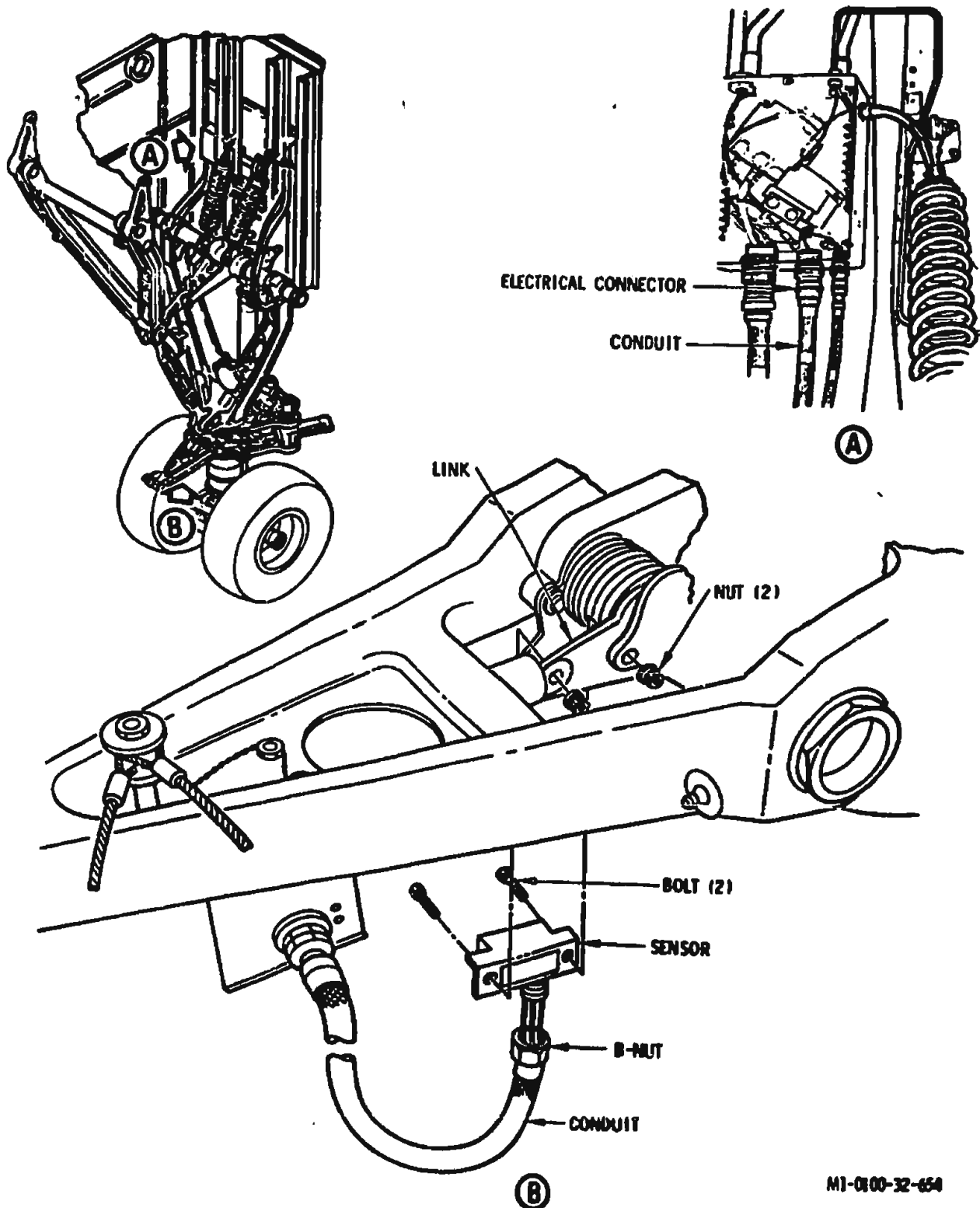
- R (1) Verify that circuit breaker opened in Step A(1) is open
R and tagged.

R EFFECTIVITY: ALL
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001B

32-63-02
Page 401
Nov 15/76

LOCKHEED
MAINTENANCE MANUAL



M1-0100-32-654

NLG Air/Ground Safety Sensor
Removal and Installation
Figure 401

EFFECTIVITY: ALI.

32-63-02
Page 402
Nov 15/76

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LOCKHEED
MAINTENANCE MANUAL

- R (2) Connect pull-wire to sensor wires at torque arm end of
R conduit and pull sensor wires through conduit until
R sensor is snug against rigid conduit.
- R (3) Connect rigid conduit to sensor and tighten B-nut.
- R (4) Connect sensor wires to electrical connector as follows
R (Ref. WDM 20-21-00):
- R (a) Red wire to pin 1
- R (b) Blue wire to pin 3
- R (c) Yellow wire to pin 2
- R (5) Connect electrical connector to J-box.
- R (6) Install sensor on upper torque arm link. Do not
R tighten nuts.
- R (7) Safety sensor B-nut with 0.042-inch diameter lock-wire.
- R (8) Safety electrical connector with 0.025-inch diameter
R lock-wire.
- R (9) Adjust sensor-to-target gap (Ref. 32-63-00).
- R (10) Verify that nuts securing sensor to link are tight.

R EFFECTIVITY: ALL
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32-63-02
Page 403/404
Nov 15/76



TAIL SKID CONTROL SYSTEM - DESCRIPTION AND OPERATION

1. General

The tail skid system and associated control is provided to prevent damage to the aircraft aft underbody in case of inadvertent overrotation during takeoff or landing. The system (Ref. Fig. 1) consists of the tail skid control system, a retractable tail skid assembly, and a tail skid four-way three-position selector valve module. Control is initiated by the landing gear control switch (Ref. 32-31-00), through the tail skid relay, to the selector valve module. The indicator circuit consists of the TAIL SKID caution light; two proximity sensors and targets; and associated dimmer and logic circuits of the indicator lights control box (Ref. 33-17-00), logic box, and proximity switch card module (Ref. 31-22-00).

The tail skid relay is located in the forward electronic service center, zone 112. The TAIL SKID caution light is located on the Flight Engineer/Second Officers upper panel annunciator subpanel, zone 215. The selector valve module and the retractable tail skid assembly are located aft of the APU compartment, zone 318. The two proximity sensors and targets are installed in the retractable tail skid assembly.

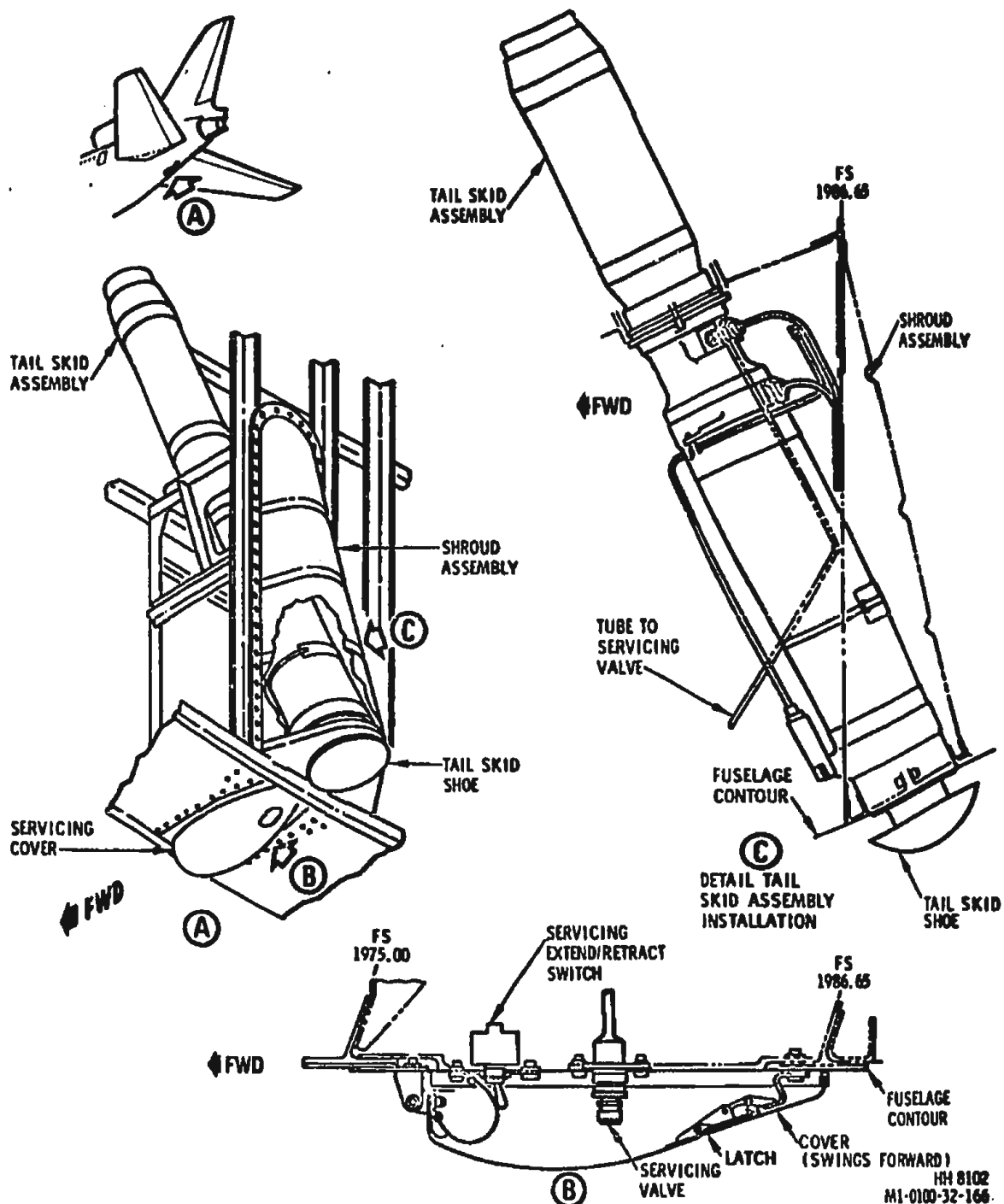
A two-position switch to extend and retract the tail skid and a hydraulic/air or nitrogen servicing valve are located just forward of the tail skid shoe.

2. Operation

The selector valve module is energized (Ref. Fig. 2) by the dc bus extension No. 1 through two segments of the landing gear control switch. When the landing gear control is placed in the DOWN position, the tail skid relay solenoid is energized to complete the dc power circuit to the selector valve module extend (down) solenoid. Solenoid-controlled hydraulic valve action in the selector valve module permits unlocking and extending the tail skid using pressure from hydraulic system A.

When the landing gear control is placed in the UP position, the tail skid relay solenoid is deenergized to break the dc power circuit to the selector valve module extend (down) solenoid; and the dc power circuit to the selector valve module retract (up) solenoid is completed. Solenoid-controlled hydraulic valve action in the selector valve module permits hydraulic pressure to retract the tail skid. The uplock, unlock, relief valve locks the tail skid in the retracted position.

LOCKHEED
MAINTENANCE MANUAL



Tail Skid Aft Body Installation
Figure 1

EFFECTIVITY: ALL

32-71-00

Page 2
Dec 1/71

050B



Two sensors and targets, along with logic circuits in the proximity switch card module and logic box, make up a system which compares the position of the tail skid with the position of the landing gear control. When the tail skid is in transit to either the extend or retract position, the TAIL SKID caution light comes on. When the tail skid reaches the extend or retract position, the TAIL SKID caution light goes off. The TAIL SKID caution light remains off when the landing gear control is moved from the UP to the NEUTRAL position in flight.

3. Retractable Tail Skid Assembly

A. Description

R The retractable tail skid assembly is a conventional oleo-pneumatic shock strut capable of being retracted (Ref. Fig. 3). The shock strut contains a regulator valve to meter flow of hydraulic fluid during strut compression. A high pressure chamber and piston are incorporated to reduce hydraulic pressure peaks during initial compression.

R NOTE: Tail skids (PN 673101-101 through -113) have
R approximately one inch protrusion fully retracted and
R tail skids (PN 673101-115 and -117) have
R approximately two inches protrusion retracted.

The strut fill port, which is connected through plumbing to a fill valve located on the underbody centerline, provides servicing capability. A floating piston actuated by hydraulic pressure provides retraction. Extension is performed by gas compressed in the strut. An uplock, unlock, relief valve holds the strut piston in the retracted position; the valve releases the strut piston for extension.

B. Operation

Compression shocks are absorbed by upward movement of the strut piston into the cylinder. Upward movement forces fluid above the strut piston diaphragm to move the regulator valve piston, against spring tension, to permit fluid flow through the metering ports. Fluid volume above the valve is increased which, in turn, further compresses the nitrogen gas and cushions the aircraft from shock. As compression shock is eased, fluid forced into the volume above the valve (acted upon by the increase in gas pressure) opens the return poppet valve and returns to the lower chamber below the regulator valve.

The initial shock of compression is relieved by the lower poppet valve and high pressure piston. The strut piston returns to the extended position. Retraction is

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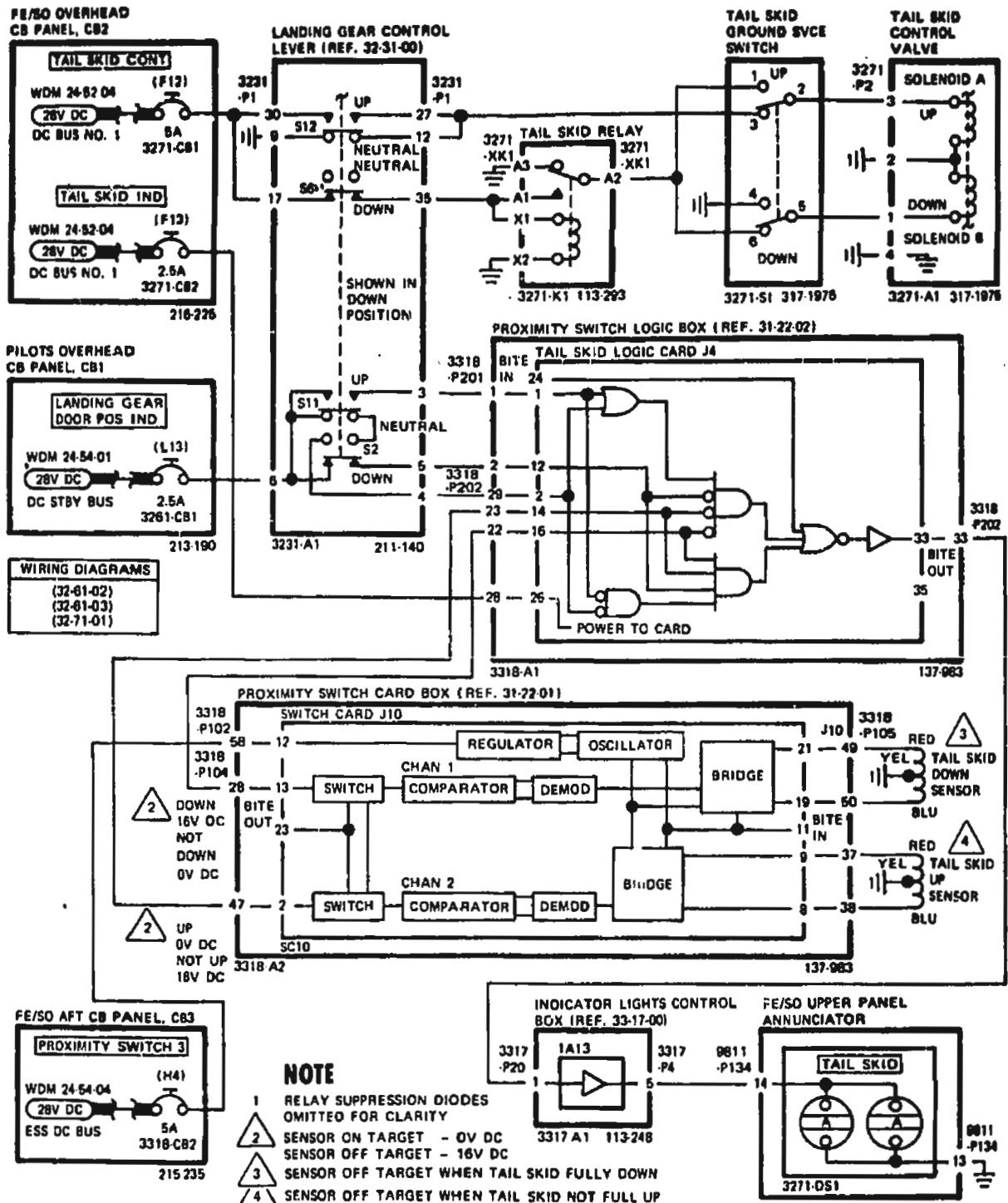
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Page 3

May 15/85

LOCKHEED

MAINTENANCE MANUAL



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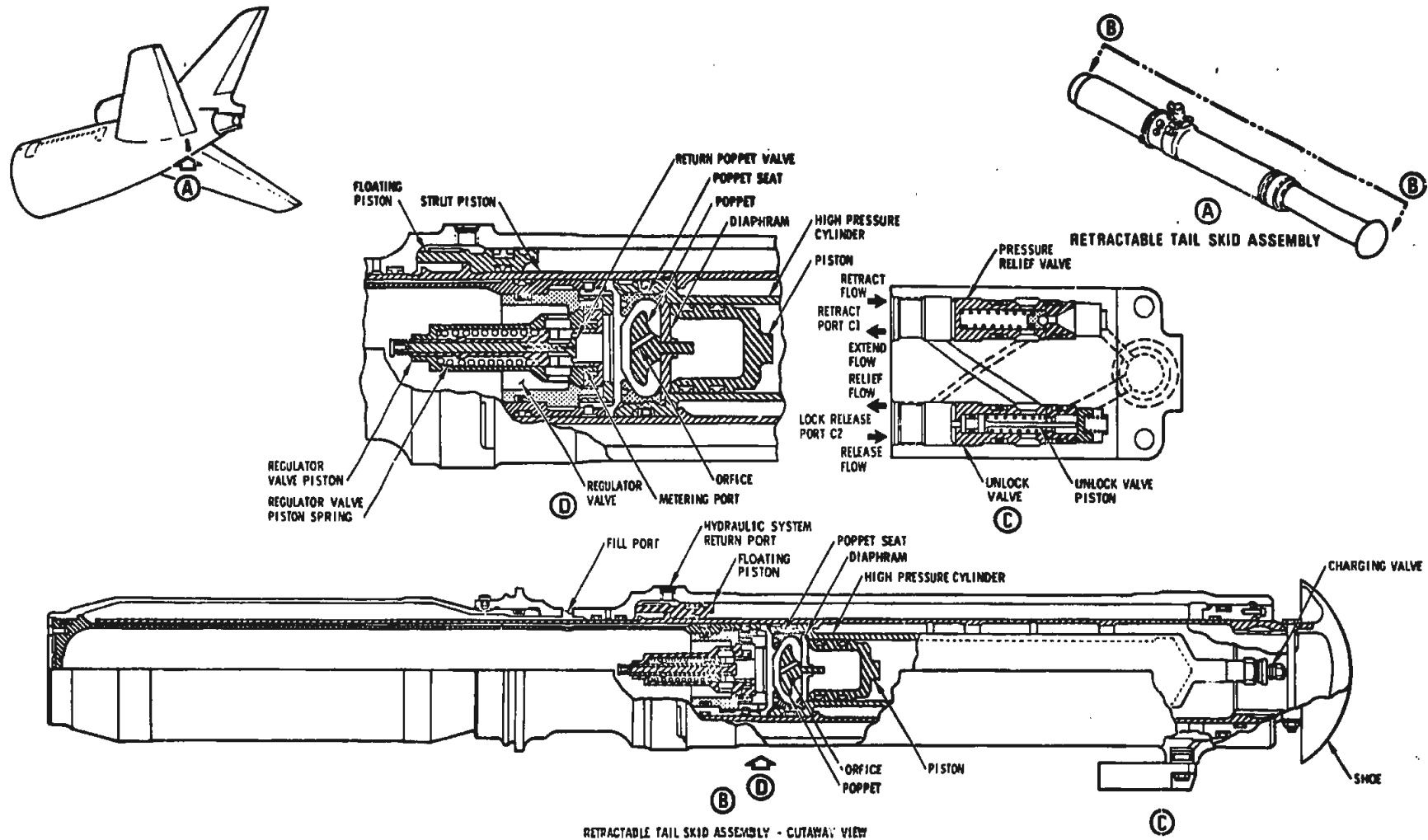
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Tail Skid Control System Electrical Schematic Diagram
Figure 2

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32-71-00
Page 4
Dec 15/93

001B



Retractable Tail Skid Assembly
Figure 3

R EFFECTIVITY: ALL
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32-71-00
Page 5/6
Dec 15/79

M1-0100-32-371



accomplished as hydraulic system A pressure (Ref. Fig. 4) is applied to the tail skid uplock, unlock, relief valve retract port (C1). Hydraulic fluid under pressure flows across to open the uplock valve. The opened uplock valve allows fluid to enter the retractable tail skid assembly chamber between the strut piston and the cylinder shell. Fluid forces the floating piston upward carrying the strut piston along until the retracted position is reached. Hydraulic pressure is then released and the uplock valve closes. The strut piston is held retracted by the uplock valve action.

Extension is accomplished as system hydraulic pressure is applied to the tail skid uplock, unlock, relief valve unlock port (C2). The unlock valve piston unseats the valve and allows fluid flow out of the chamber between the strut piston and the cylinder shell through the unlock valve, across to the retract port (C1), and back to hydraulic system return.

Hydraulic system return pressure is constantly applied to the retractable tail skid assembly return port. As the strut piston is extended, fluid flows in to fill the void created by the floating piston movement. When a shock compression is encountered, hydraulic system return pressure prevents the floating piston from moving with the strut piston. As the piston is retracted, floating piston movement forces the fluid out of the chamber created by the strut piston extension.

4. Tail Skid Four-way Three-position Selector Valve Module

A. Description

The hydraulic selector valve, when electrically energized through the landing gear control, directs hydraulic pressure and fluid flow to the retractable tail skid assembly. The hydraulic selector valve consists of the main valve section, two solenoid pilot valves, and a hydraulic fuse (Ref. Fig. 5).

B. Operation

The solenoid pilot valves control the position of the main valve section. With the main valve slide positioned in the center (off) position, hydraulic system pressure is applied to the two solenoid pilot valves. Energizing one of the pilot valves pulls the solenoid plunger away from the valve ball which allows hydraulic pressure to unseat the ball. Hydraulic pressure is applied through the valve body passage to one end chamber of the main valve. The main valve slide

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001B EFFECTIVITY: ALL

32-71-00

Page 7
May 15/85

LOCKHEED



MAINTENANCE MANUAL

is positioned to allow hydraulic system pressure to be directed into the main valve section and out the cylinder port to the retractable tail skid assembly.

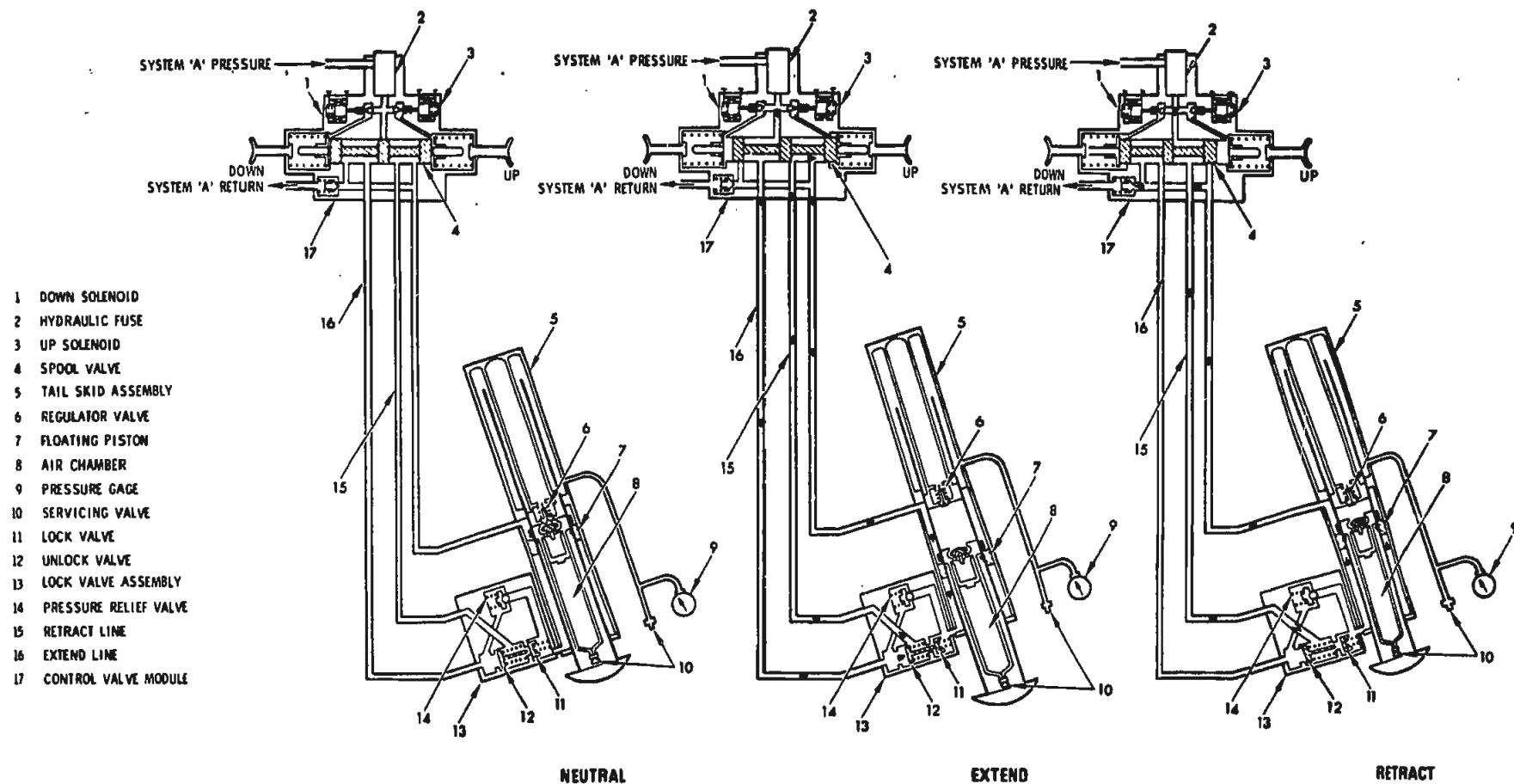
Deenergizing the pilot valve allows the solenoid plunger to seat the valve ball. Hydraulic pressure is relieved from the main valve end chamber through the solenoid pilot valve to system return. Relieving hydraulic pressure in the end chamber allows the main valve slide to return to the center (off) position, which cuts off system pressure to the retractable tail skid assembly.

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EFFECTIVITY: ALL

32-71-00

Page 8
May 15/85

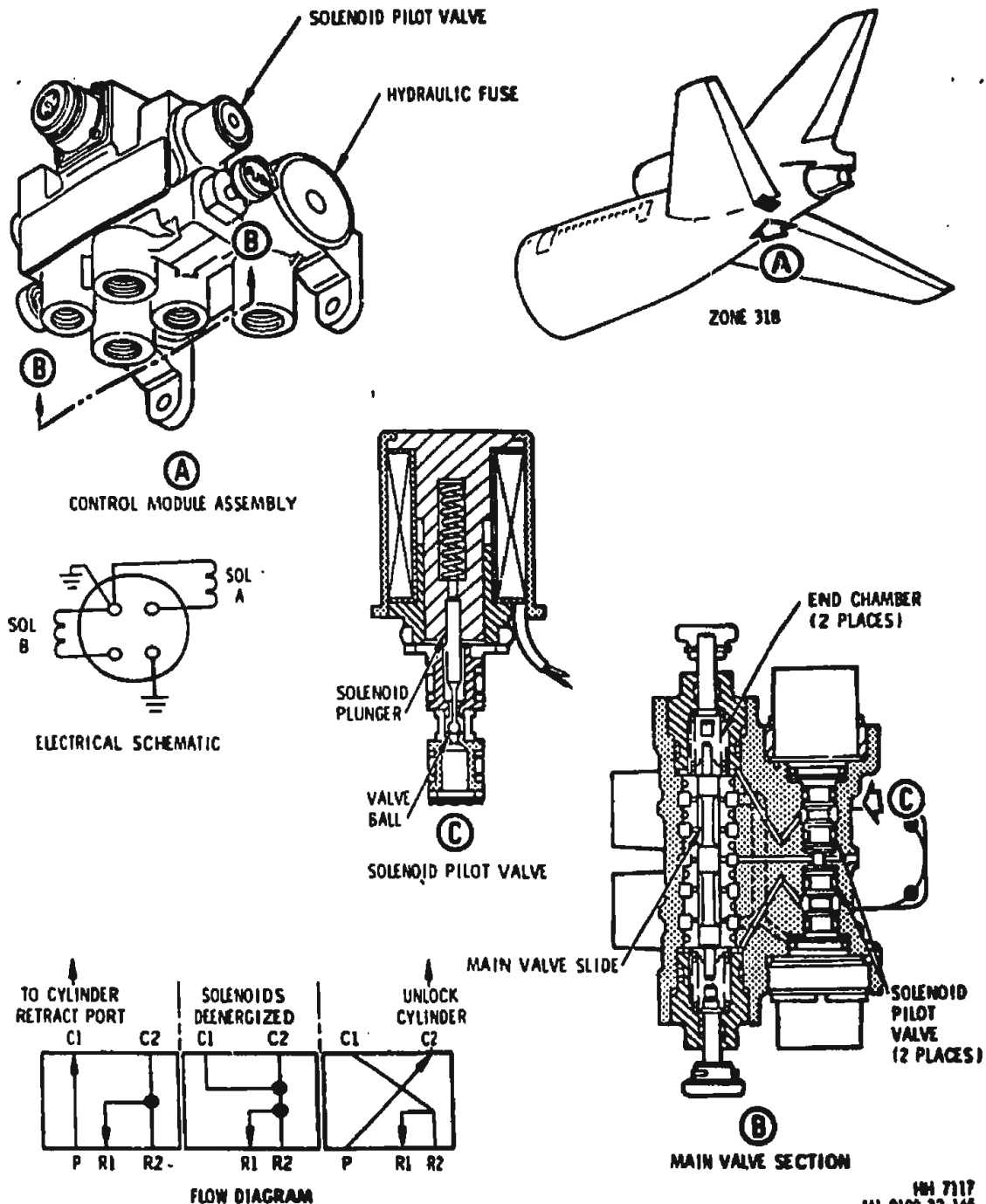


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Tail Skid Hydraulic Schematic
Figure 4

32-71-00
Page 9/10
Dec 15/79

LOCKHEED
MAINTENANCE MANUAL



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Tail Skid Selector Valve Module
Figure 5

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EFFECTIVITY: ALL

32-71-00
Page 11/12
Dec 15/79

LOCKHEED
MAINTENANCE MANUAL

R TAIL SKID CONTROL SYSTEM - FAULT ISOLATION

R 1. General

R Reference data and fault isolation procedures for
R troubleshooting landing gear system faults are included in this
R section of the manual. A landing gear system malfunction
R detected by the flight crew is normally entered in the aircraft
R flight log book and reported to maintenance personnel by a FIRM
R fault code number. This number and the flight log book write-up
R can be found in the Chapter 32 Fault Code Index. The index
R specifies the maintenance manual section, fault isolation
R diagram figure number and, where appropriate, a block number
R indicating the diagram entry point containing the fault
R isolation procedure. When no block number is specified, the
R diagram entry point is Block 1.

R Prerequisites listed at the top of each diagram identify
R mandatory preliminary steps and circuit breakers that must be
R closed before initiating any fault isolation step.

R Schematic diagrams, identified by a SCHEM number, supplement
R fault isolation procedures as maintenance aids. The schematics
R show the basic system circuitry necessary for troubleshooting
R and include cross-reference indexes to the wiring diagram manual
R pages required for checking component interconnect wiring.

R 2. Supplemental data

R Supplementary data includes functional tests, checkout tests,
R BITE checks and other general information that can be helpful in
R performing fault isolation. Supplementary data in this section
R is listed in Table 101.

Supplemental Data
Table 101

FIGURE	TITLE
101	Tail Skid Hydraulic Diagram

R 3. Fault Isolation

R Table 102 is a list of fault isolation data in this section of
R the manual

R EFFECTIVITY: ALL
R
001B

32-71-00
Page 101
Mar 15/81

LOCKHEED
MAINTENANCE MANUAL

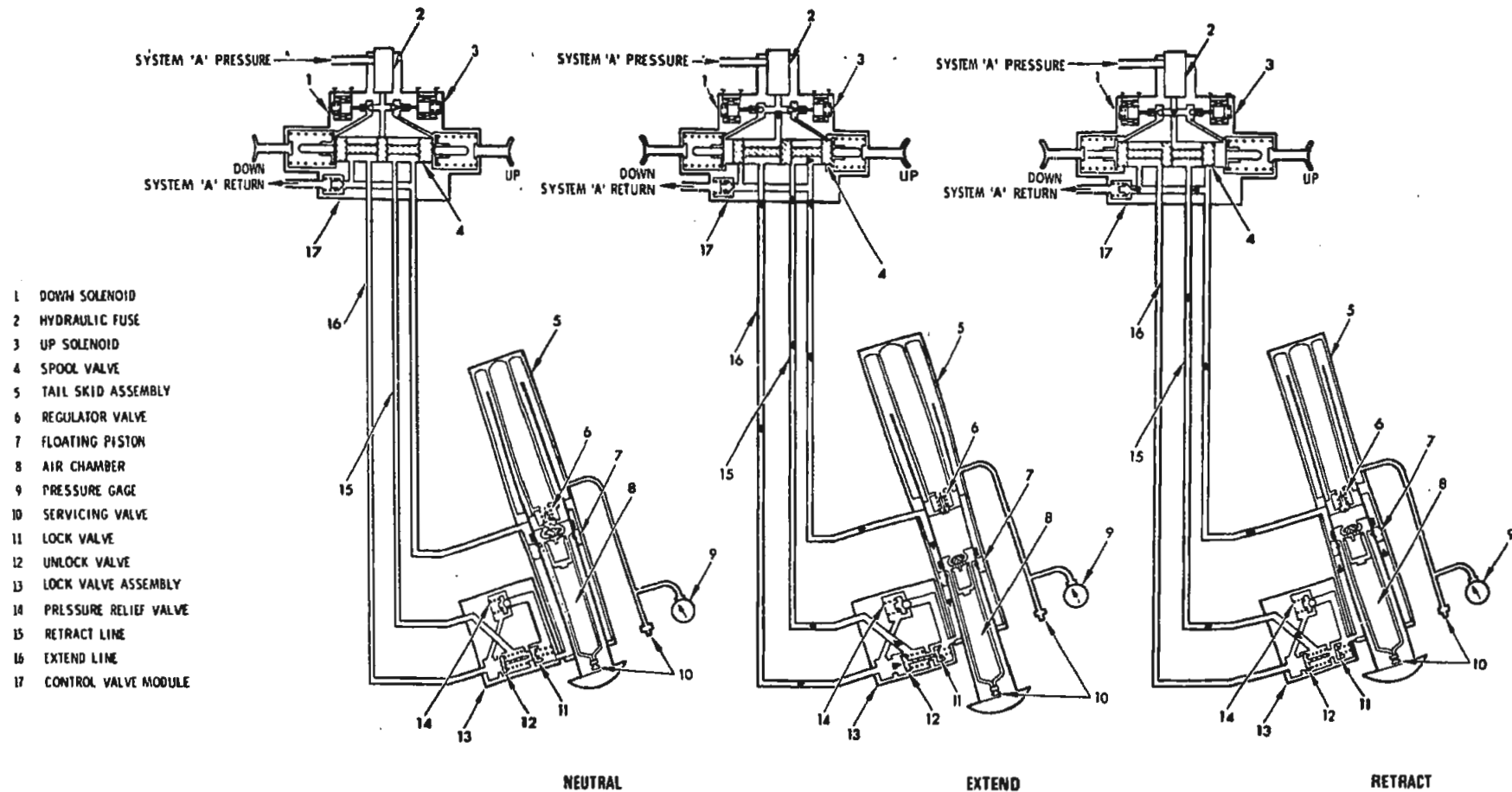
R Tail Skid Control System Fault Isolation
R Table 102
R

R	FIGURE	TITLE
R		
R	102	Component Location Index
R	103	Components Locator Diagram
R	104	Tail Skid Does Not Retract
R	105	Tail Skid Does Not Extend
R	106	TAIL SKID Light Comes On With Gear Control Lever In R NEUTRAL
R	SCHEM 1	Tail Skid Control System Electrical Schematic
R		

R EFFECTIVITY: ALL
R
001B

32-71-00
Page 102
Mar 15/81

LOCKHEED
MAINTENANCE MANUAL



M1-0101-32-195

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Tail Skid Hydraulic Diagram
Figure 101

EFFECTIVITY: ALL

001B

32-71-00
Page 103/104
Mar 15/81

LOCKHEED
MAINTENANCE MANUAL

COMPONENT	QTY	AREA/ACCESS	REFERENCE
CARD J4, PROXIMITY SWITCH LOGIC	1	MESC; 192K, 192AE	31-22-01
RELAY, TAIL SKID	1	FESC; 112AB, 211AB	24-00-00
SWITCH, LANDING GEAR CONTROL	1	FLIGHT STATION; P2	32-31-14
SWITCH, TAIL SKID GROUND SERVICE	1	CTR AFTERBODY; 318BA	24-00-00
TAIL SKID, RETRACTABLE	1	CTR AFTERBODY; 439AZ	32-71-01
VALVE, TAIL SKID SELECTOR	1	LEFT AFTERBODY; 318BL	32-71-02
VALVE, UPLOCK, UNLOCK	1	ON TAIL SKID; 439AZ	32-71-05

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Component Location Index
Figure 102

EFFECTIVITY: ALL

001B

32-71-00
Page 105/106
Mar 15/81

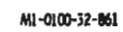


Figure 103

EFFECTIVITY: ALL

32-71-00
Page 107/108
Mar 15/81

LOCKHEED
MAINTENANCE MANUAL

PREREQUISITES

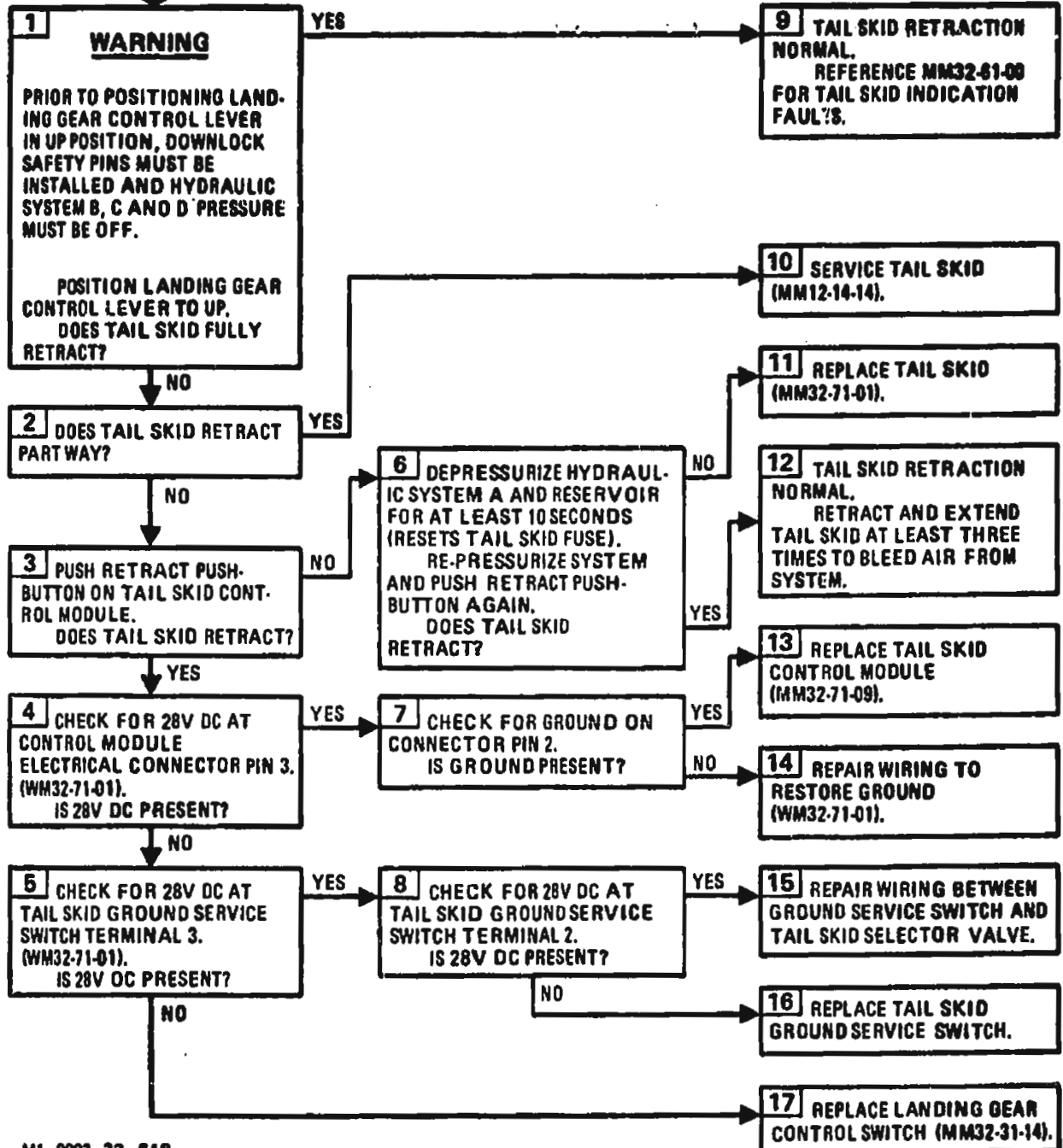
ELECTRICAL POWER (MM24-00-00)

HYDRAULIC PRESSURE A (MM29-11-00)

TAIL SKID GROUND SERVICE SWITCH IN DOWN POSITION

CB's IN: CB2-F12

TAIL SKID DOES NOT RETRACT



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Tail Skid Does Not Retract
Figure 104

EFFECTIVITY: ALL

001B

32-71-00
Page 109
Nov 15/87

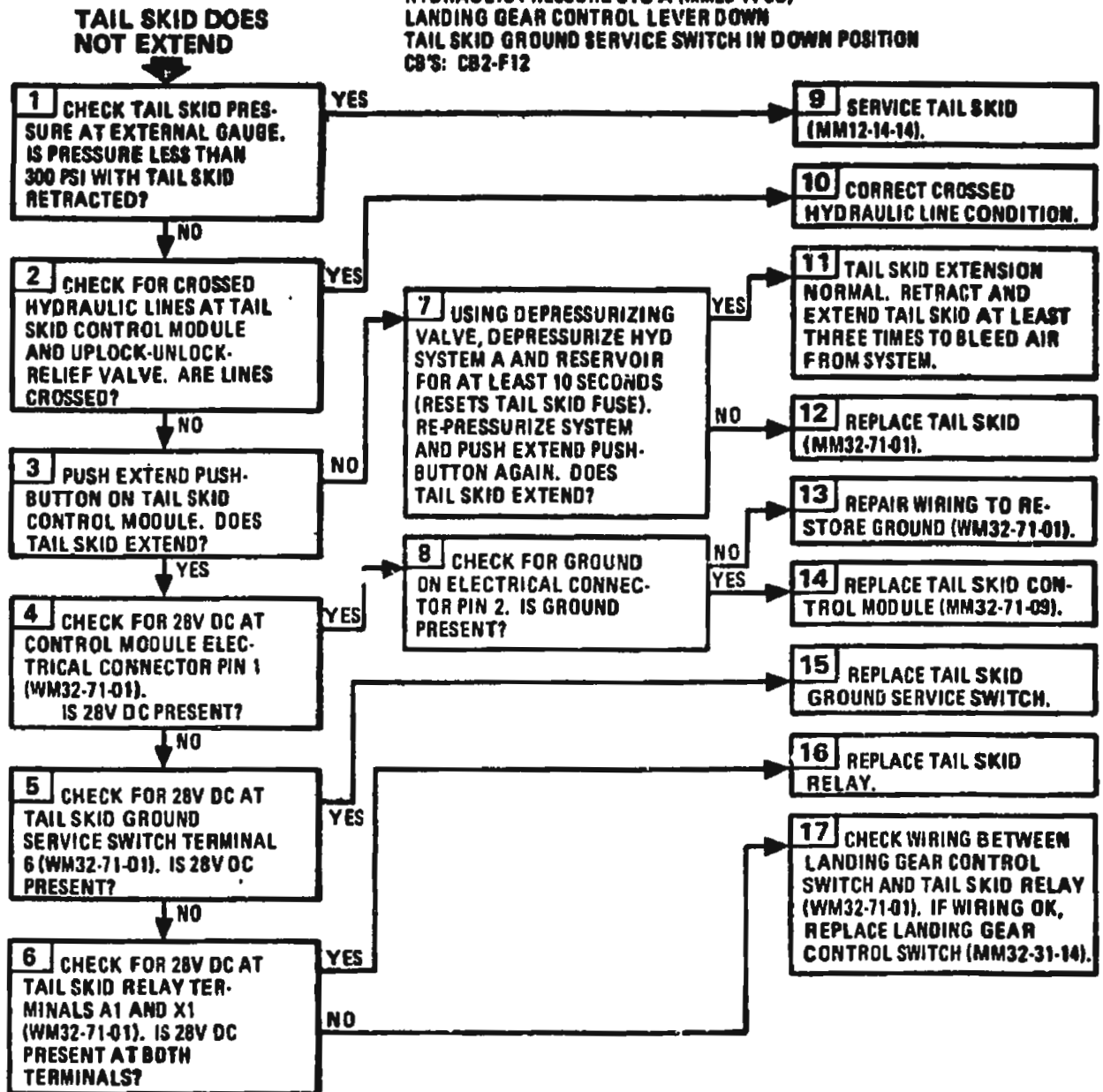
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MAINTENANCE MANUAL

PREREQUISITES

ELECTRICAL POWER (MM24-00-00)
HYDRAULIC PRESSURE SYS A (MM29-11-00)
LANDING GEAR CONTROL LEVER DOWN
TAIL SKID GROUND SERVICE SWITCH IN DOWN POSITION
CB'S: CB2-F12



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Tail Skid Does Not Extend
Figure 105

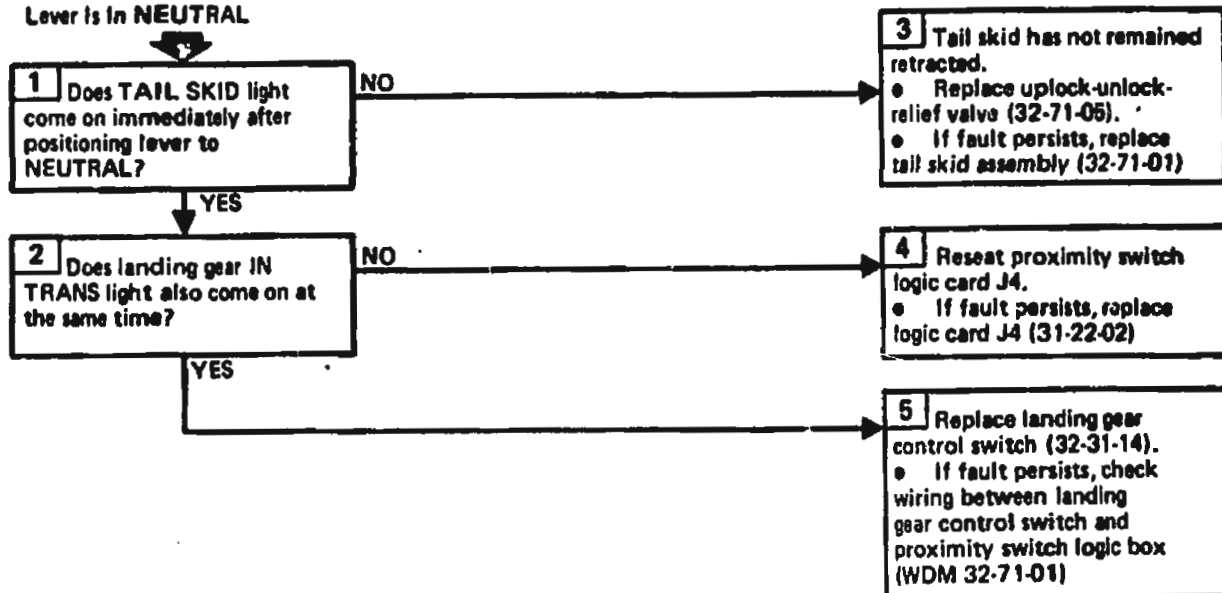
EFFECTIVITY: ALL

32-71-00
Page 110
Mar 15/81

001B



TAIL SKID Light Comes On
When LANDING GEAR Control
Lever Is In NEUTRAL



PREREQUISITES

Elec Pwr (24-00-00)
Landing gear downlock safety pins installed
Hydraulic Pressure A on (29-11-00)
Hydraulic Pressure C off (29-11-00)
CB's in: CB1-L13
 CB2-F12, F13
 CB3-H4
CB's out: CB2-F17, F18

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TAIL SKID Light Comes On When LANDING GEAR
Control Lever Is In NEUTRAL
Figure 106

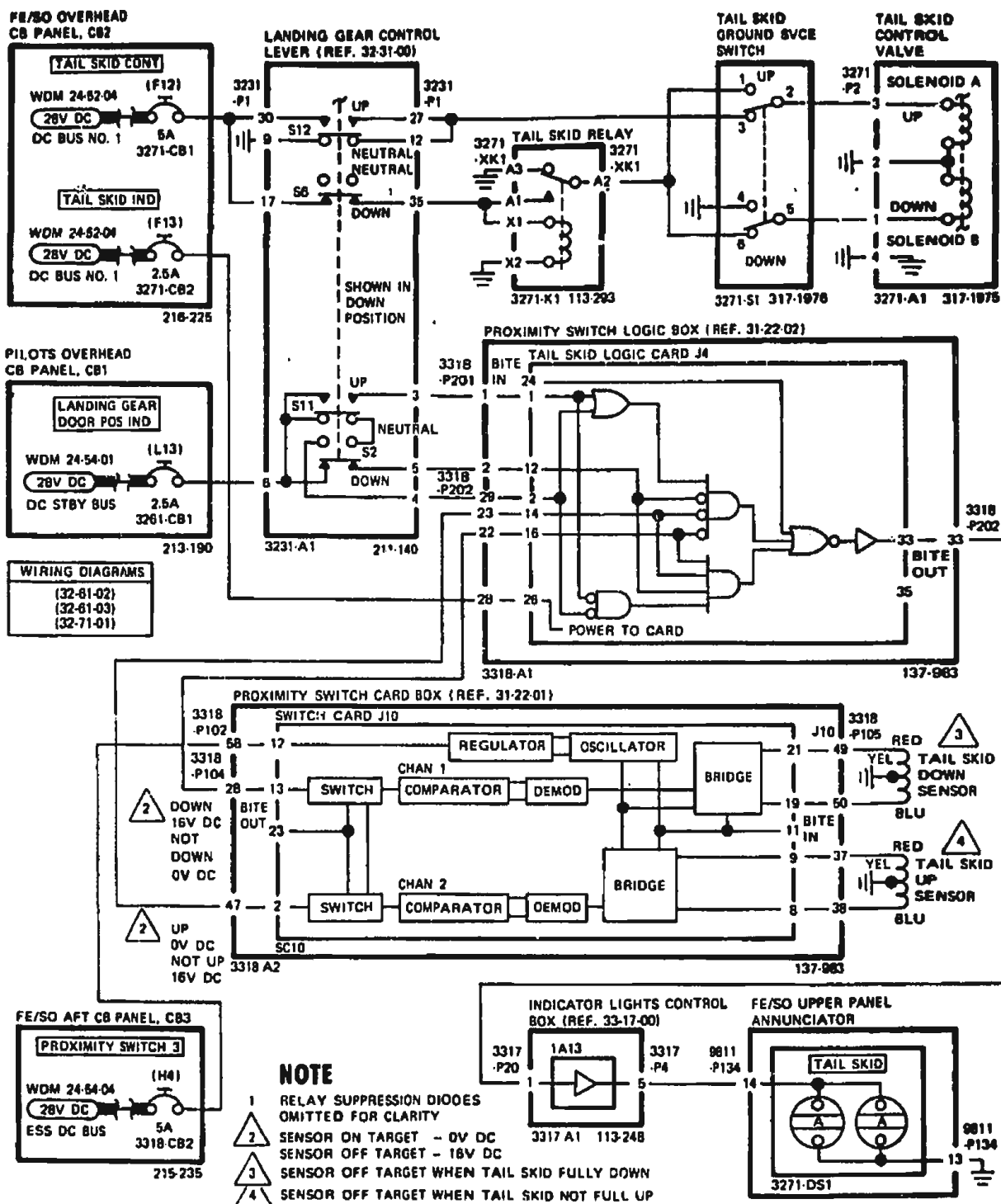
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EFFECTIVITY: ALL

32-71-00
Page 111
Mar 15/81

001B

LOCKHEED
MAINTENANCE MANUAL



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**Tail Skid Control System Electrical Schematic
SCHEM 1**

EFFECTIVITY: ALL

001B

32-71-00
Page 112
Dec 15/93

TAIL SKID CONTROL SYSTEM - MAINTENANCE PRACTICES**1. General**

When the tail skid control system has failed so that extension cannot be accomplished by normal landing gear control, the tail skid can be manually extended provided it is in an operable condition.

2. Equipment and Materials

Regulated gaseous nitrogen or dry air supply capable of delivering 300 psi pressure

Ground hydraulic pressure source capable of delivering 3300 psi pressure

3. Referenced Procedures

24-41-00 External Power System - Maintenance Practices

29-11-00 Hydraulic Power System - Maintenance Practices

4. Maintenance Practices**A. Deactivation**

NOTE: This deactivation procedure applies only when an aircraft is to be dispatched in accordance with the MEL.

- (1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, open and collar TAIL SKID CONT (F12) circuit breaker.
- (2) Install placard to indicate that tail skid is inoperative.
- (3) Make appropriate entry in aircraft log book.

B. Tail Skid Extension

- (1) To extend tail skid using ground service switch, proceed as follows:

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WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

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LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

R
R
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PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

R
R

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (a) Turn on external power (Ref. 24-41-00).
- (b) Turn on hydraulic system A pressure (Ref. 29-11-00).
- (c) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, ensure that TAIL SKID CONT (F12) circuit breaker is closed.
- (d) Open tail skid ground servicing access door, 318BA, located directly forward of tail skid shoe (Ref. Fig. 201).
- (e) Ensure that tail skid pressure gage indicates approximately 300 psi. Charge as required.

WARNING: ENSURE THAT PERSONNEL AND EQUIPMENT ARE CLEAR OF TAIL SKID SHOE TRAVEL AREA.

- (f) Place ground service switch to EXTEND position.
- (g) Close tail skid ground servicing access door 318BA.
- (h) Open and tag circuit breaker closed in Step 4B(1)(c).
- (i) Turn off hydraulic system A pressure as applicable (Ref. 29-11-00).
- (j) Turn off external power as applicable (Ref. 24-41-00).
- (k) If aircraft is to be operated with tail skid extended, install placard to indicate that tail skid is extended.
- (l) Make appropriate entry in aircraft log book.

EFFECTIVITY: ALL

001B

32-71-00

Page 202
Nov 15/84

LOCKHEED
MAINTENANCE MANUAL

(2) To extend tail skid using control valve manual operation, proceed as follows:

- (a) Turn on hydraulic system A pressure (Ref. 29-11-00).
- (b) Deactivate electrical control as called out in Step 4A(1).
- (c) Open access panel 318BL (Ref. Fig. 201).
- (d) Ensure that tail skid pressure gage indicates approximately 300 psi. Charge as required.

WARNING: ENSURE THAT PERSONNEL AND EQUIPMENT ARE CLEAR OF TAIL SKID SHOE TRAVEL AREA.

- (e) On tail skid control valve (Ref. Fig. 201), depress DOWN pushbutton until tail skid is extended.
- (f) Close access panel 318BL.
- (g) Turn off hydraulic system A pressure as applicable (Ref. 29-11-00).
- (h) If aircraft is to be operated with tail skid extended, install placard to indicate that tail skid is extended.
- (i) Make appropriate entry in aircraft log book.

(3) To extend tail skid by applying hydraulic pressure to tail skid unlock port, proceed as follows:

- (a) Ensure that hydraulic system A pressure is 0 psi (Ref. 29-11-00).
- (b) Ensure that electrical control is deactivated in accordance with Step 4A(1).
- (c) Open access panel 318AR (Ref. Fig. 201).
- (d) Disconnect hydraulic line from tail skid unlock port.
- (e) Plug hydraulic line.
- (f) Connect ground hydraulic pressure source to unlock port.

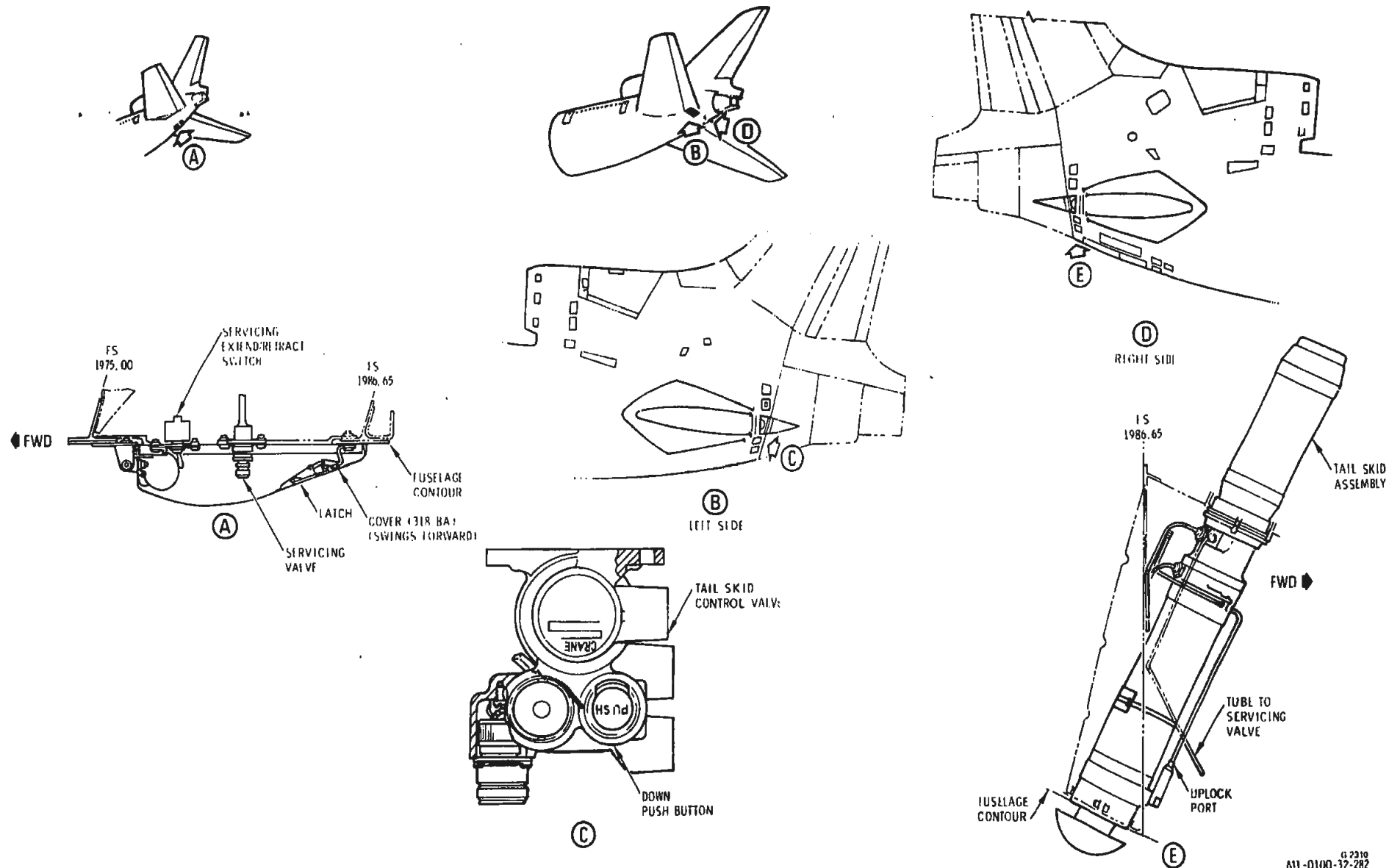


WARNING: ENSURE THAT PERSONNEL AND EQUIPMENT ARE CLEAR OF TAIL SKID SHOE TRAVEL AREA.

- (g) Ensure that tail skid pressure gage indicates approximately 300 psi. Charge as required.

CAUTION: DURING MAINTENANCE PROCEDURES, HYDRAULIC PRESSURE WHEN APPLIED FROM EXTERNAL SOURCES MUST NOT EXCEED 3100 PSI.

- (h) Turn on ground hydraulic pressure (minimum 700 psi) until tail skid is extended.
- (i) Turn off ground hydraulic pressure and ensure that pressure is 0 psi.
- (j) Disconnect ground hydraulic pressure source.
- (k) Connect hydraulic line to tail skid unlock port.
- (l) Close access panel 318AR.
- (m) Turn off hydraulic system A pressure as applicable.
- (n) If aircraft is to be operated with tail skid extended, install placard to indicate that tail skid is extended.
- (o) Make appropriate entry in aircraft log book.



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Line Maintenance Tail Skid Retraction
Figure 201

32-71-00
Page 205/206
Oct 1/72

EFFECTIVITY: ALL



TAIL SKID ASSEMBLY - INSPECTION AND CHECK

1. General

Paragraphs 3A and 3B are procedures which cover the inspection and check of the tail skid and surrounding structure, after a contact has been made with the runway or ground surface during landing or takeoff operations.

Paragraph 3C is a check of the tail skid to determine if a hydraulic fluid bypass is occurring which will prevent the tail skid from remaining retracted when the LANDING GEAR control lever is positioned to NEUTRAL after gear retraction.

2. Referenced Procedures

24-00-00	Electrical Power - Maintenance Practices
29-11-00	Hydraulic Power System - Maintenance Practices
32-71-01	Retractable Tail Skid - Removal and Installation
78-30-00	Trust Reverser - Adjustment and Test

3. Inspection/Check

A. Shoe Wear and External Surrounding Area Inspection/Check

NOTE: Total tail skid compression range is 18.84 inches. Tail skid can be compressed 10 inches before ground contact with the fuselage structure occurs.

- (1) Inspect shoe for wear. Shoe is operational if not worn through, or wear does not exceed a 4-1/2-inch diameter flat spot.
 - (a) If the triangular safety wire pattern is installed and intact, then the wear spot has been checked and found to be serviceable.
 - (b) If the safety wire is broken, a tail drag has occurred and the wear should be checked per 3.A.(1).
 - (c) If the check in 3.A.(1)(b) indicates a serviceable skid shoe, replace the safety wire pattern as follows:

C
CR
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C
C
C

C
C
C

EFFECTIVITY: ALL

32-71-00
Page 601
Dec 15/91

001B



MAINTENANCE MANUAL

CR
CR

NOTE: The following steps will prevent F.O.D. from safety wire.

CR
CR
CR

1) Remove and discard all safety wire remnants tied around the tail skid piston. Cut three pieces of 0.024 inch CRES safety wire 30 inches.

CR
CR
CR
CR

2) Wrap each piece of wire once around the tail skid piston just above the shoe. Twist together approximately one quarter inch at the piston such that the free ends are of equal length.

CR
CR
CR

3) Pass the free ends of each pair of wires through adjacent holes and twist them together to form a triangle as shown in Figure 601.

CR
CR

4) Trim the twist to approximately three sixteenths inch.

CR
CR

(d) If shoe wear is beyond limit in 3.A.(1), replace per 32-71-08.

- (2) Inspect APU overboard mast for damage. Ensure that mast hole is not restricted.
- (3) Inspect water drain mast for damage. Ensure that heater is operational and mast hole is not restricted.
- (4) Inspect thrust-reverser stang translating cover for damage. If damage goes beyond superficial scraping, a more detailed inspection is required (Ref. 78-30-00).
- (5) If inspection reveals signs of abrasion from ground contact, at approximately FS 1760 to FS 1860, perform internal/external structural damage inspection, Paragraph 3B. If not abraded, proceed to Step (6).
- (6) Inspect tail skid piston for bends, cracks, or other obvious damage. If piston is not damaged, perform Steps (6)(a) and (b). If piston is cracked, bent, or shows any other obvious damage, replace tail skid and perform internal/external structural damage inspection, Paragraph 3B.
 - (a) Check tail skid pressure gage. Pressure should be 100 psi when tail skid is extended.
 - (b) Using ground service control switch, retract and extend tail skid. Check for sticking and leaking fluid.

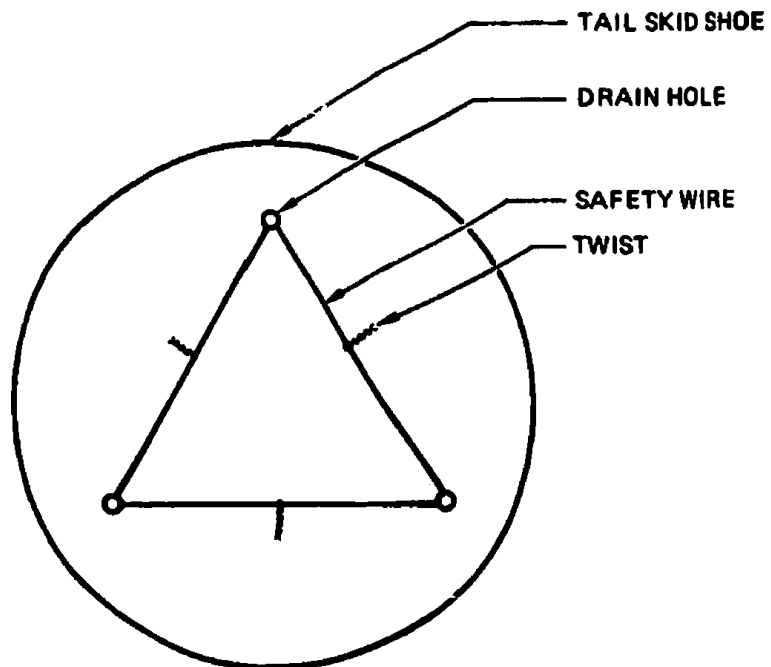
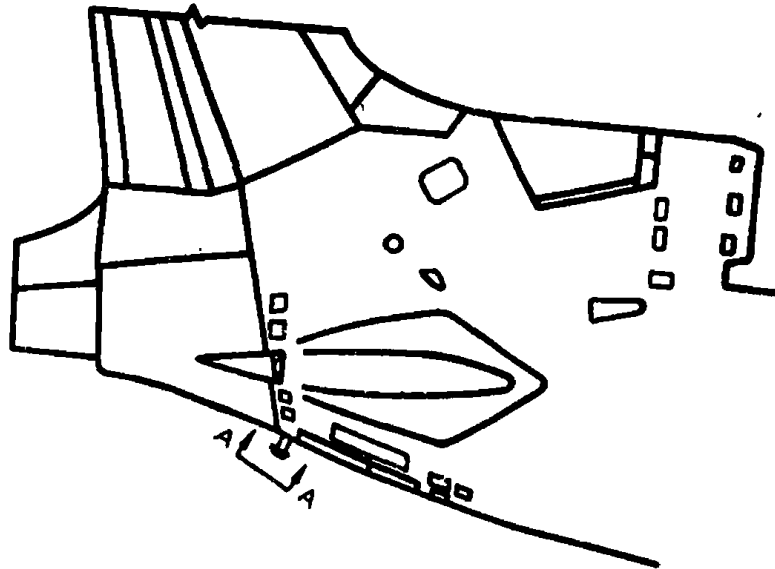
B. Internal/External Structural Damage Inspection

EFFECTIVITY: ALL

001B

32-71-00
Page 602
Mar 15/91

LOCKHEED
MAINTENANCE MANUAL



VIEW A-A

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CR
CR

Bottom view of tail skid shoe
Figure 601

R EFFECTIVITY: ALL
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001B

32-71-00
Page 603
Mar 15/91

NOTE: Machined into the tail skid piston are two annular grooves (fuses) in the piston internal walls which purposely weaken the piston structure. These grooves or fuses are for the purpose of causing the piston to break off and carry away, upon excessively hard contact, prior to causing aircraft structural damage.

- (1) Inspect fuselage exterior for dents and scraping.
- (2) Perform inspection of internal/external areas as follows:
 - (a) FS 1792 frame (forward of aft pressure dome).
 - (b) Lower portion of aft pressure dome.
 - (c) FS 1832, FS 1837, and FS 1850 frames (aft of aft pressure dome).
 - (d) FS 1860 bulkhead (vertical stiffeners, web, and caps).
 - (e) FS 1885 bulkhead (APU firewall).
 - (f) No. 2 engine stang.
- (3) Replace tail skid as required (Ref. 32-71-01).

C. Hydraulic Fluid Bypass Check

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (1) Turn on hydraulic system A pressure (Ref. 29-11-00).
- (2) Turn on electrical power (Ref. 24-00-00).
- (3) Open access panel 318 BA to gain access to tailskid ground service switch.
- (4) Using switch, retract tail skid.

R EFFECTIVITY: ALL

001B

32-71-00

Page 604
Mar 15/91

LOCKHEED



MAINTENANCE MANUAL

- C
- (5) Measure distance from edge of tail skid shoe to fuselage skin. Mark this position.
 - (6) Turn off hydraulic system A pressure (Ref. 29-11-00).
 - (7) Wait 60 minutes and measure distance at same position as Step (5). If distance has increased more than 1/8 inch, tailskid (32-71-01) or uplock unlock relief valve (32-71-05) is bypassing hydraulic fluid.
 - (8) Turn on hydraulic system A pressure (Ref. 29-11-00).
 - (9) Using switch, extend tailskid.
 - (10) Turn off hydraulic system A pressure (Ref. 29-11-00).
 - (11) Turn off electrical power (Ref. 24-00-00).
 - (12) Close access panel 318 BA.

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EFFECTIVITY: ALL

32-71-00
Page 605/606
Mar 15/91

LOCKHEED
MAINTENANCE MANUAL

RETRACTABLE TAIL SKID - REMOVAL AND INSTALLATION

1. Equipment and Materials

Container, 2 gallon

Hose, 1/4-inch ID minimum, high pressure (400 psi), with fitting on one end to be connected to tail skid servicing valve

Lock-wire, QQ-W-390, 0.020-inch diameter, inconel, condition A, or equivalent

Lock-wire, QQ-W-390, 0.040-inch diameter, inconel, condition A, or equivalent

Tail Skid Servicing Unit G/ITEL 12-13-06, or equivalent

2. Referenced Procedures

12-14-14	Tail Skid - Servicing
24-00-00	Electrical Power - Maintenance Practices
26-11-27	No. 2 Engine Vertical Fire Wall Fire Sensor Assembly - Removal and Installation
29-11-00	Hydraulic Power System - Maintenance Practices
32-71-08	Tail Skid Shoe - Removal and Installation
71-12-01	LH and RH Lower Hinge Cows - Servicing

3. Removal/Installation

A. Removal

- (1) Ensure that landing gear downlock safety pins are installed.
- (2) Turn on electrical power (Ref. 24-00-00).



MAINTENANCE MANUAL

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WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (3) Turn on hydraulic system A pressure (Ref. 29-11-00).
- (4) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, verify that TAIL SKID CONT (F12) circuit breaker is closed.
- (5) Open tail skid servicing cover 318BA; secure in open position using pin and streamer stowed inside cover (Ref. Fig. 401).
- (6) Remove servicing valve cap and connect drain hose to valve. Place end of hose into container and secure firmly.

WARNING: HIGH PRESSURE FLUID BEING RELEASED, FOLLOWED BY GASEOUS NITROGEN, MAY CAUSE SPRAY, SPLASHING, AND HOSE WHIPPING. OBSERVE CAUTION WHILE DRAINING FLUID AND RELEASING GASEOUS NITROGEN.

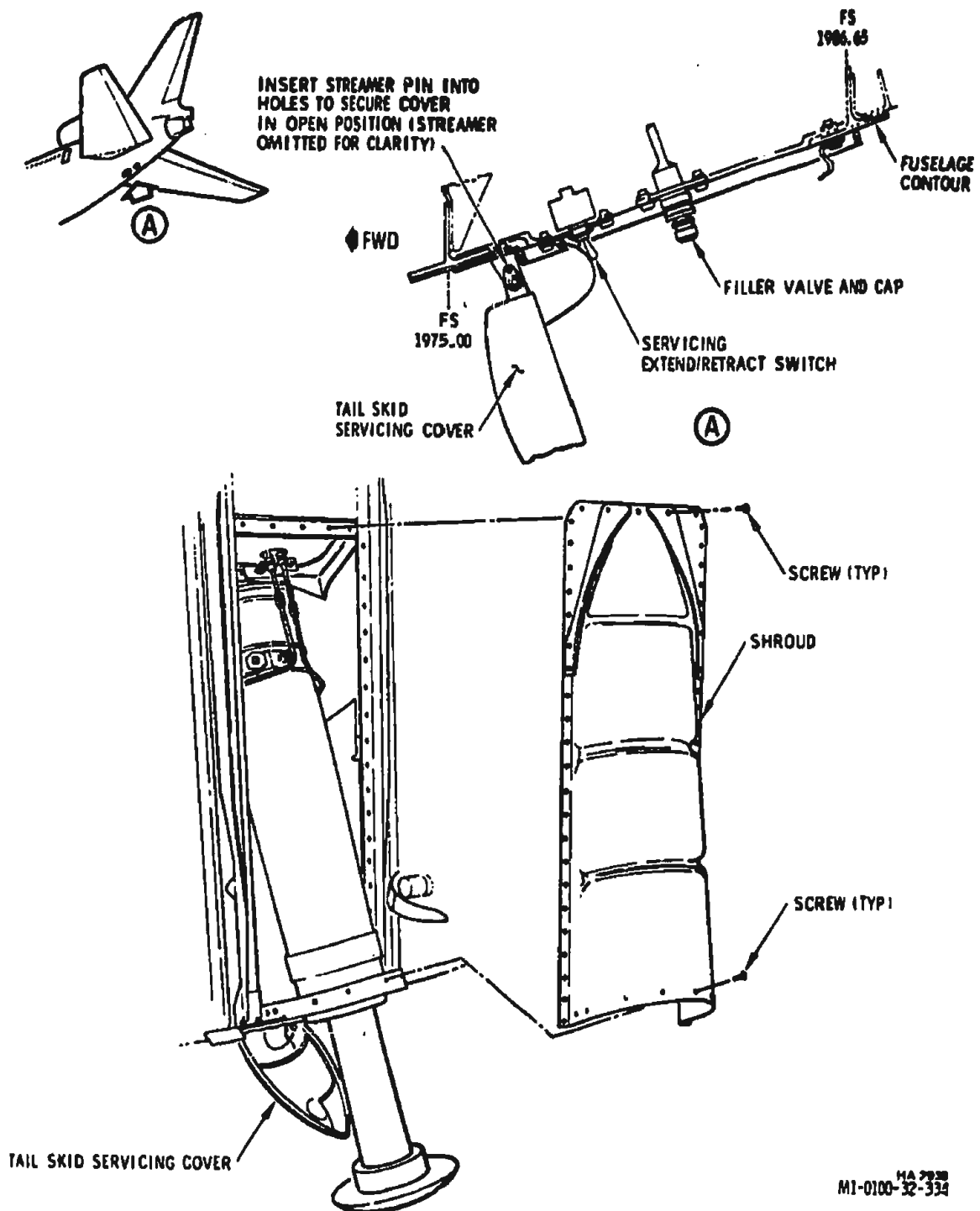
- (7) Slowly open servicing valve and release pressurized hydraulic fluid and gaseous nitrogen into container.
- (8) At tail skid servicing area, position TAIL SKID OPERATING SWITCH to RETRACT. Tail skid must retract. Catch any additional hydraulic fluid being expelled out servicing valve.
- (9) Disconnect hose, close servicing valve, and install servicing valve cap.
- (10) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag TAIL SKID CONT (F12) and TAIL SKID IND (F24) circuit breakers.
- (11) Turn off hydraulic system A pressure (Ref. 29-11-00).
- (12) Turn off electrical power (Ref. 24-00-00).
- (13) Remove lower chamber air or nitrogen charge as follows:

EFFECTIVITY: ALL

001B

32-71-01
Page 402
Nov 15/84

LOCKHEED
MAINTENANCE MANUAL



Tail Skid Shroud - Removal and Installation
Figure 401

EFFECTIVITY: ALL

32-71-01
Page 403
Nov 15/81

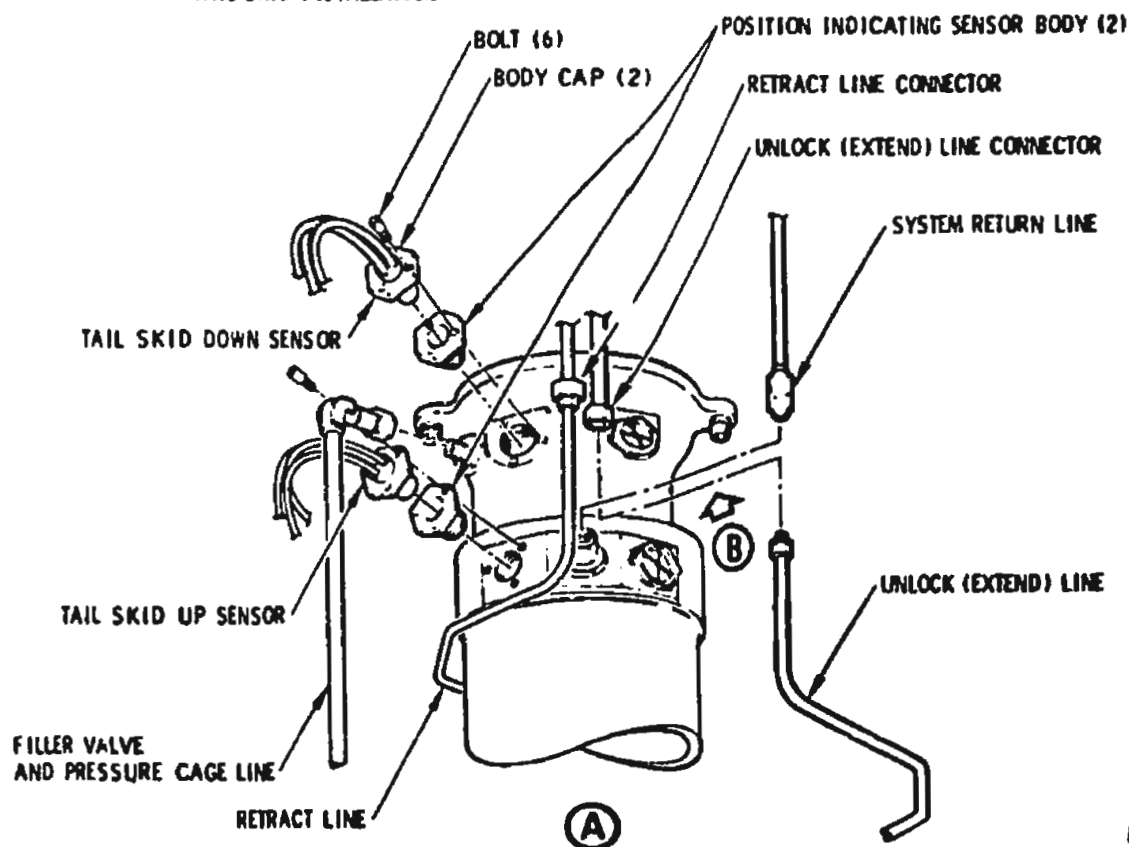
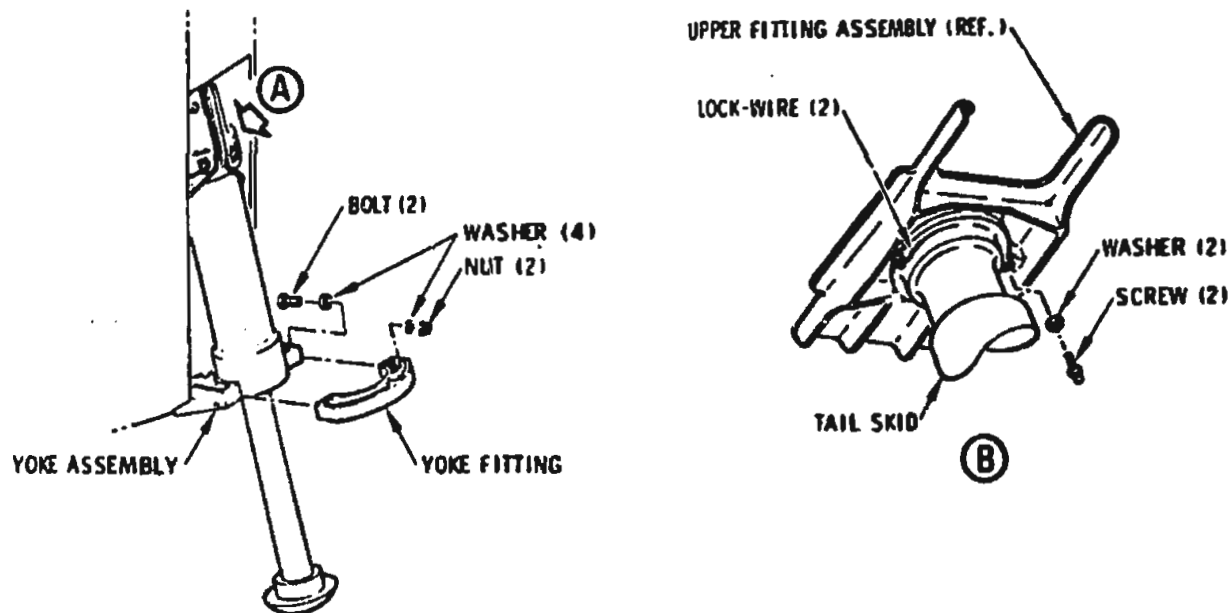
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- (a) Remove tail skid shoe (Ref. 32-71-08).
 - (b) Slowly open servicing valve, in bottom of piston, 3 to 4 turns. Leave open until all air or nitrogen has been exhausted.
 - (c) Close valve, install cap, and install tail skid shoe.
- (14) Open left and right lower hinged panels (Ref. 71-12-01).
 - (15) Remove fire wall fire sensor assembly (Ref. 26-11-27).
 - (16) Remove screws securing shroud to structure. Remove shroud (Ref. Fig. 401).
 - (17) Remove screws securing both position indicating sensors to tail skid and tag sensors for correct installation position. Remove sensors (Ref. Fig. 402).
 - (18) Remove sensor body if inspection shows diaphragm distortion or buckling.
 - (19) On aircraft 001-031, this step is not required.
 - (19) On aircraft 032-999, remove hydraulic line support block.
 - (20) Tag for installation, then disconnect following hydraulic lines and catch spilled fluid in container (Ref. Fig. 402):
 - (a) Servicing valve and pressure gage line from tail skid.
 - (b) System return line from tail skid.
 - (c) Retract and unlock lines at connectors.
 - (21) Cap and plug lines and tail skid ports to prevent contamination.
 - (22) Remove screws securing yoke fitting to structure. Remove yoke fitting (Ref. Fig. 402).

NOTE: Yoke assembly is a matched set. Yoke fitting must be installed on structure yoke from which removed.

LOCKHEED
MAINTENANCE MANUAL



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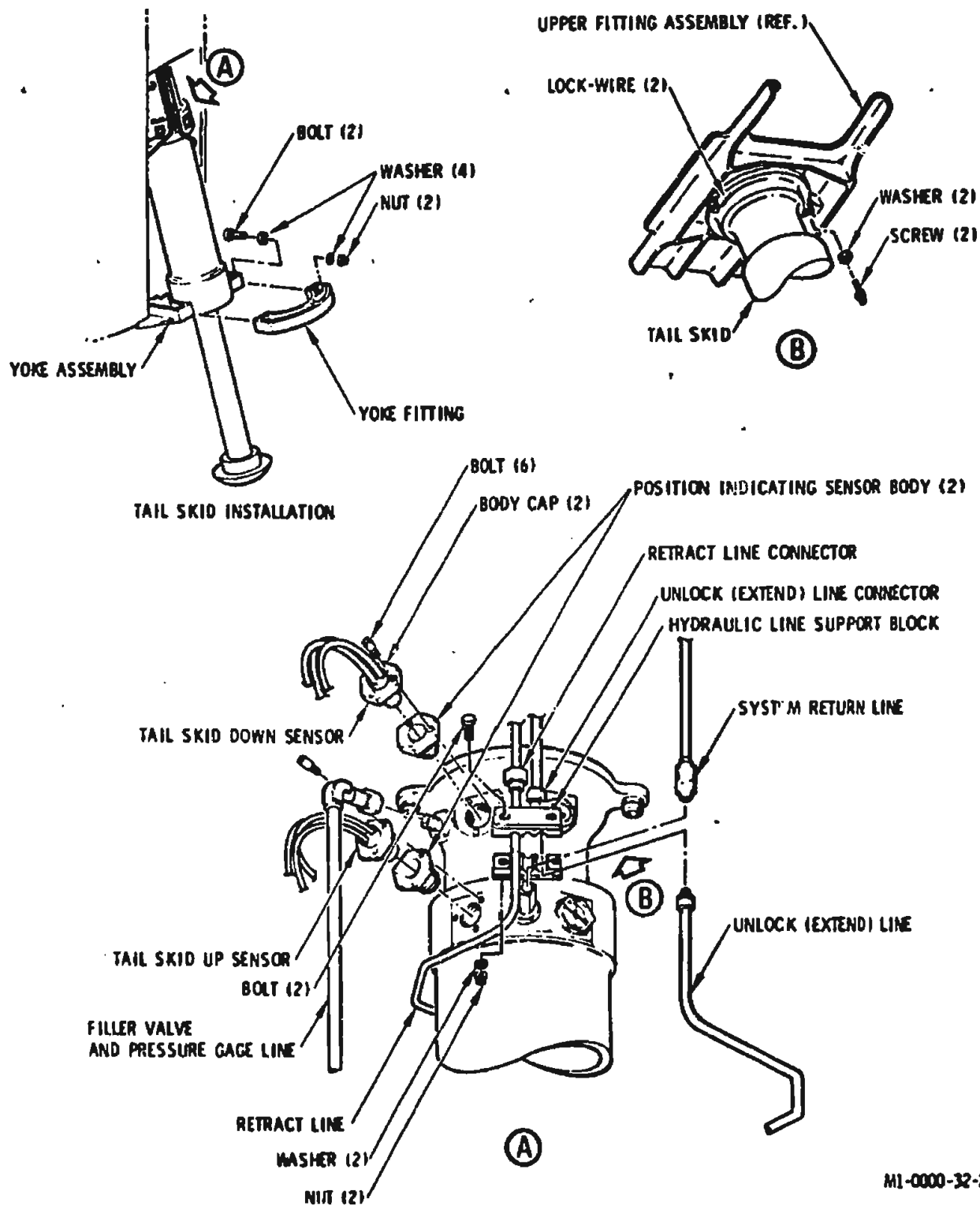
Tail Skid Assembly Disconnects
Figure 402

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EFFECTIVITY: 001-031

32-71-01
Page 405
Mar 15/81

LOCKHEED
MAINTENANCE MANUAL



MI-0000-32-297

Tail Skid Assembly Disconnects
Figure 402



MAINTENANCE MANUAL

WARNING: TAIL SKID WEIGHS APPROXIMATELY 80 POUNDS. CARE MUST BE EXERCISED TO RESTRAIN THE TAIL SKID PRIOR TO REMOVAL FROM SUPPORTING FITTINGS.

- (23) Remove screws securing tail skid to upper fitting. Remove tail skid.
- (24) Disconnect retract and unlock lines and remove associated clamps from tail skid.
- (25) Cap and plug lines and tail skid ports to prevent contamination.

B. Installation

NOTE: The tail skid when new or when out of overhaul is normally in a retracted condition. In the event the tail skid is extended, it can be retracted by applying low (50 psi) hydraulic pressure to the uplock-unlock-relief valve retract port. Care must be exercised to provide a means of catching spilling hydraulic fluid from the extend port in the event there is hydraulic fluid in the piston upper chamber.

- (1) Ensure that hydraulic system A pressure is off (Ref. 29-11-00).
- (2) Verify that circuit breakers opened in Step 3A(9) are open and tagged.
- (3) Connect retract and unlock lines to tail skid and secure in place with associated clamps (Ref. Fig. 402). Ensure that hydraulic lines are positioned correctly.
- (4) Install tail skid through upper support fitting and secure with screws and washer.
- (5) Install yoke fitting around tail skid body and secure with screws, washers, and nuts.
- (6) Safety screws installed in Step 3B(4) with 0.040-inch diameter lock-wire.
- (7) Connect retract and unlock lines to connectors. Verify that lines are positioned correctly.
- (8) Connect system return line to tail skid.
- (9) On aircraft 001-031, this step is not required.

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EFFECTIVITY: ALL

32-71-01

Page 407
Nov 15/84

LOCKHEED
MAINTENANCE MANUAL

- (9) On aircraft 032-999
install hydraulic line support block 0.5 (± 0.2) inches
above system return line fitting.
- (10) Connect filler valve and pressure gage line to tail
skid.
- (11) Inspect position sensor bodies for diaphragm distortion
or buckling; replace as required.
- (12) Install both position sensor bodies.
- (13) Secure both position indicating sensors to tail skid
with screws. Observe tags for correct installation
position. Remove tags.
- (14) Safety sensors with 0.020-inch diameter lock-wire.
- (15) Install shroud and secure with screws.
- (16) Remove tags and close circuit breakers opened in Step
3A(12).
- (17) Extend tail skid as follows:

(a) Turn on electrical power (Ref. 24-00-00).

WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY
HYDRAULIC SYSTEM:

LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR
SAFETY DEVICES ARE INSTALLED.

PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF
ALL FLIGHT CONTROL SURFACES AND GEAR DOOR
TRAVEL AREAS.

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT
HYDRAULIC PRESSURE.

(b) Turn on hydraulic system A pressure (Ref.
29-11-00).

(c) At tail skid servicing area, position TAIL SKID
OPERATING SWITCH to EXTEND.

CAUTION: DURING TAIL SKID EXTENSION WITH SERVICING
UNIT, ENSURE HYDRAULIC PRESSURE DOES NOT
EXCEED 300 PSI.

(d) Connect Tail Skid Servicing Unit to external
servicing valve.

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001B

EFFECTIVITY: ALL

32-71-01
Page 408
Nov 15/84

LOCKHEED
MAINTENANCE MANUAL

- (e) Open external servicing valve and service until tail skid is fully extended.
- (f) Close external servicing valve and disconnect Tail Skid Servicing Unit.

(18) Perform normal tail skid servicing (Ref. 12-14-14).

C. Operational Check

- (1) Verify that electrical power is turned on (Ref. 24-00-00).
- (2) Verify that hydraulic system A pressure is on (Ref. 29-11-00).
- (3) Verify that pilots LANDING GEAR control lever zone 210, is in DOWN position.
- (4) With tail skid extended, position TAIL SKID OPERATING SWITCH to RETRACT position.

NOTE: Tail skids (PN 673101-101 through -113) have approximately one inch protrusion fully retracted and tail skids (PN 673101-115 and -117) have approximately two inches protrusion retracted.

- (5) Observe Flight Engineer/Second Officers annunciator panel TAIL SKID light.

NOTE: While tail skid is retracting, tail skid light should be on. When tail skid is retracted, light will remain on.

- (6) Position TAIL SKID OPERATING SWITCH to EXTEND position.
- (7) Observe TAIL SKID light.

NOTE: While tail skid is extending, TAIL SKID light should be on. When tail skid is extended, light should go off.

- (8) Turn off electrical power as required (Ref. 24-00-00).
- (9) Turn off hydraulic system A pressure (Ref. 29-11-00).
- (10) Install firewall fire sensor assembly (Ref. 26-11-27).
- (11) Close left and right lower hinged panels (Ref. 71-12-01).

EFFECTIVITY: ALL

32-71-01
Page 409/410
May 15/85

001B

LOCKHEED
MAINTENANCE MANUAL

TAIL SKID SELECTOR CONTROL VALVE - REMOVAL AND INSTALLATION

1. Referenced Procedures

- 12-14-14 Tail Skid Servicing
- 24-00-00 Electrical Power - Maintenance Practices
- 29-11-00 Hydraulic Power System - Maintenance Practices

2. Removal/Installation

A. Removal

NOTE: If tail skid is extended, Steps 2A(1)(a) through (9) are not necessary.

(1) Extend tail skid as follows:

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WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY HYDRAULIC SYSTEM:

R
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LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY DEVICES ARE INSTALLED.

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PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL AREAS.

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THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT HYDRAULIC PRESSURE.

- (a) Turn on hydraulic system A pressure (Ref. 29-11-00).
- (b) Turn on electrical power (Ref. 24-00-00).
- (c) Open tail skid ground servicing access door, 318BA, located directly forward of tail skid shoe.
- (d) Ensure that tail skid pressure gage indicates approximately 300 psi.

WARNING: ENSURE THAT PERSONNEL AND EQUIPMENT ARE CLEAR OF TAIL SKID SHOE TRAVEL AREA.

- (e) Place ground service switch to EXTEND position (Ref. Fig. 401).

EFFECTIVITY: ALL

001B

32-71-02
Page 401
Nov 15/84

LOCKHEED
MAINTENANCE MANUAL

- (f) Turn off hydraulic system A pressure (Ref. 29-11-00).
- (g) Turn off electrical power as required (Ref. 24-00-00).
- (2) Ensure that hydraulic system A pressure is 0 psi by depressurizing system A accumulator (Ref. 29-11-00).
- (3) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, open and tag TAIL SKID CONT (F12) circuit breaker.
- (4) Open access panel 318BL (Ref. Fig. 401).
- (5) Disconnect selector control valve electrical connector (Ref. Fig. 401).

CAUTION: WHEN DISCONNECTING HYDRAULIC LINES, CARE MUST BE EXERCISED TO INITIALLY OPEN B-NUTS SLOWLY TO RELIEVE ANY RESIDUAL HYDRAULIC PRESSURE.

- (6) Tag for installation and disconnect hydraulic lines.
- (7) Plug hydraulic lines and cap selector control valve ports.
- (8) Remove bolts and washers securing valve to mounting bracket.
- (9) Remove valve.

B. Installation

- (1) Ensure that circuit breaker opened in Step 2A(3) is open and tagged.
- (2) Ensure that hydraulic system A pressure is 0 psi (Ref. 29-11-00).
- (3) Position selector control valve on mounting bracket and secure with bolts and washers.
- (4) Connect hydraulic lines to valve. Verify that hydraulic lines have been correctly connected.
- (5) Connect electrical connector to valve.
- (6) Turn on electrical power (Ref. 24-00-00).
- (7) Close circuit breaker opened in Step 2A(3) and remove tag.

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EFFECTIVITY: ALL

32-71-02
Page 402
Nov 15/84



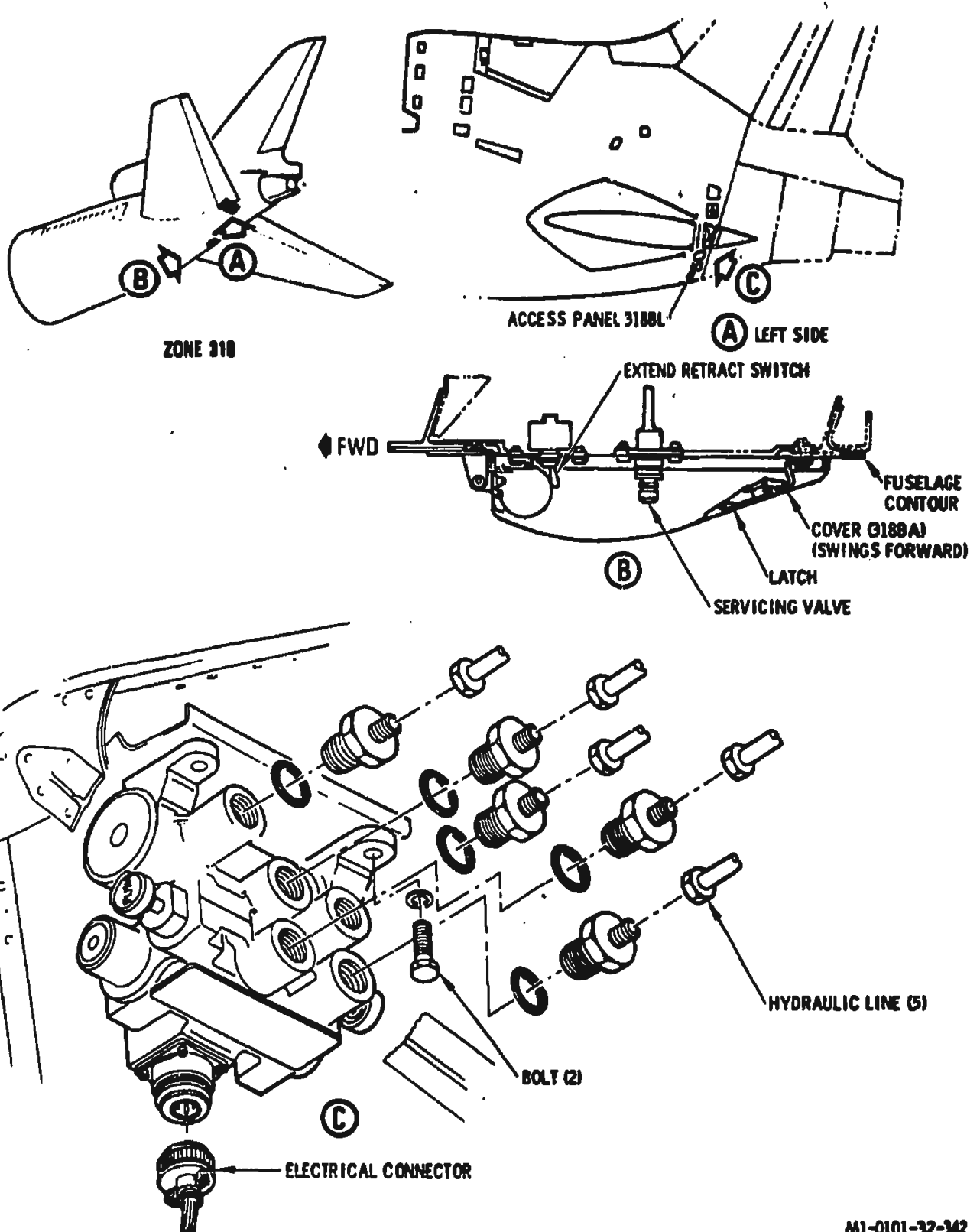
MAINTENANCE MANUAL

- (8) Turn on hydraulic system A pressure (Ref. 29-11-00).
- (9) Open tail skid ground servicing access door, 318BA, as required.
- (10) Ensure that tail skid pressure gage indicates approximately 100 psi if tail skid is extended and 300 psi if tail skid is retracted. If pressure is not proper, service tail skid with dry air or nitrogen (Ref. 12-14-14).

WARNING: ENSURE THAT PERSONNEL AND EQUIPMENT ARE CLEAR OF SHOE TRAVEL AREA

- (11) Using EXTEND RETRACT switch extend and retract tail skid five or six cycles. Check for hydraulic leaks.
- (12) Turn off hydraulic system A pressure, as required (Ref. 29-11-00).
- (13) Turn off electrical power, as required (Ref. 24-00-00).
- (14) Install access panel 318BL.
- (15) Close access door 318BA.

LOCKHEED
MAINTENANCE MANUAL



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Tail Skid Selector Control Valve - Removal and Installation
Figure 401

EFFECTIVITY: ALL

0018

32-71-02
Page 404
Jun 15/80

LOCKHEED
MAINTENANCE MANUAL

TAIL SKID UPLOCK, UNLOCK, RELIEF VALVE - REMOVAL AND INSTALLATION

1. Equipment and Materials

Container, shallow, 1 quart capacity, or equivalent

Container, 1 gallon capacity, or equivalent

2. Referenced Procedures

12-14-14 Tail Skid - Servicing

24-00-00 Electrical Power - Maintenance Practices

29-11-00 Hydraulic Power System - Maintenance Practices

3. Removal/Installation

A. Removal

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WARNING: VERIFY THE FOLLOWING BEFORE PRESSURIZING ANY
HYDRAULIC SYSTEM:

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LANDING GEAR DOWNLOCK SAFETY PINS AND DOOR SAFETY
DEVICES ARE INSTALLED.

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PERSONNEL AND GROUND EQUIPMENT ARE CLEAR OF ALL
FLIGHT CONTROL SURFACES AND GEAR DOOR TRAVEL
AREAS.

R
R

THE AFFECTED HYDRAULIC SYSTEMS CAN ACCEPT
HYDRAULIC PRESSURE.

- (1) Verify that electrical power is on (Ref. 24-00-00).
- (2) Verify that hydraulic system A is pressurized (Ref. 29-11-00).
- (3) Open tail skid servicing access cover 318BA.
- (4) Using tail skid servicing EXTEND - RETRACT switch, extend tail skid if not already extended.
- (5) Turn off electrical power as required (Ref. 24-00-00).
- (6) Turn off hydraulic system A pressure (Ref. 29-11-00) and ensure that system A pressure is 0 psi by bleeding down system A accumulator (Ref. 29-11-00).

EFFECTIVITY: ALL

001B

32-71-05
Page 401
Nov 15/84



MAINTENANCE MANUAL

- (7) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, open and tag TAIL SKID CONT (F12) circuit breaker.
- (8) Outboard of tail skid assembly, on right side of fuselage, remove access panel 318AR.
- (9) Position container under tail skid external servicing valve to catch spilling hydraulic fluid.
- (10) Remove external servicing valve cap and slowly turn valve nut 3 to 4 turns to open valve and release air or nitrogen pressure.
- (11) Remove tail skid shoe (Ref. 32-71-08), remove internal servicing valve cap, and slowly open servicing valve 1-1/2 turns to open valve and release air or nitrogen pressure.
- (12) Place shallow container under uplock, unlock, relief valve at lower end of tail skid assembly (Ref. Fig. 401).
- (13) Loosen B-nuts of both hydraulic lines to relieve residual pressure.
- (14) Tag for installation and disconnect both hydraulic lines.
- (15) Remove bolts securing uplock, unlock, relief valve to tail skid.

NOTE: On aircraft 001-019 with SB 32-070, and 020-999, a filter is installed in the valve-to-tail skid port and may fall out when the valve is removed unless it is retained in place by hand.

- (16) On aircraft 001-019 without SB32-070, remove valve.
- (16) On aircraft 001-019 with SB32-070 and 020-999, remove valve while retaining valve-to-tail skid port filter in place.

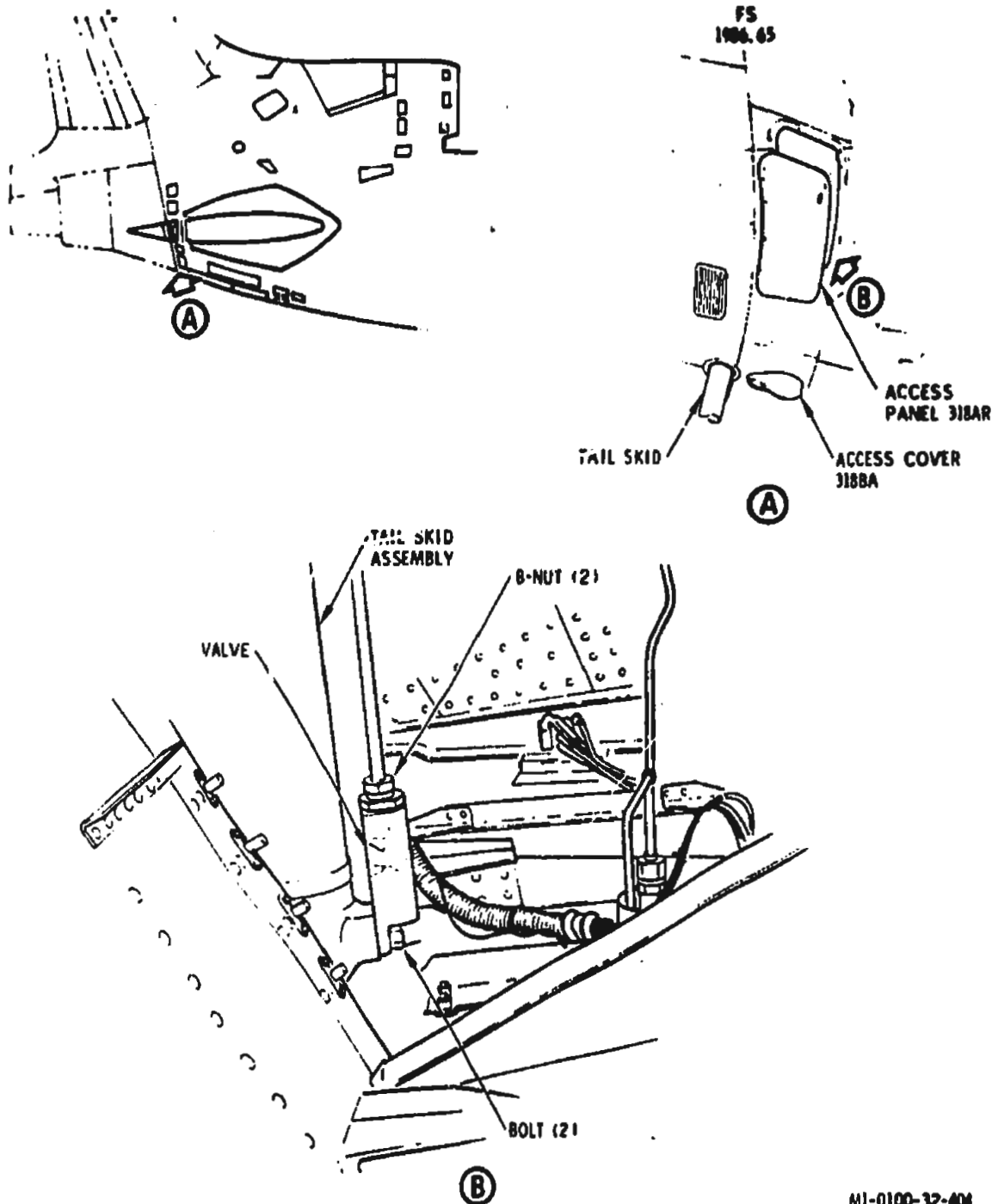
B. Installation

- (1) Verify that hydraulic system A pressure is 0 psi (Ref. 29-11-00).
- (2) Verify that circuit breaker opened in Step 3A(7) is open and tagged.

LOCKHEED
MAINTENANCE MANUAL

- (3) Inspect seal on uplock, unlock, relief valve. Replace if worn, distorted or damaged.
- (4) Verify, as applicable, that filter is installed in valve-to-tail skid port and insert valve into tail skid. Secure in place with bolts.
- (5) Connect hydraulic lines to valve. Verify that hydraulic lines are correctly connected.
- (6) Service tail skid (Ref. 12-14-14).
- (7) Remove shallow container.
- (8) Install access panel 318AR removed in Step 3A(8).
- (9) Remove tag and close circuit breaker opened in Step 3A(7).
- (10) Turn off electrical power as required (Ref. 24-00-00).
- (11) Turn off hydraulic power as required (Ref. 29-11-00).

LOCKHEED
MAINTENANCE MANUAL



MI-0100-32-404

Tail Skid Uplock, Unlock, Relief Valve - Removal and Installation
Figure 401

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001B EFFECTIVITY: ALL

32-71-05
Page 404
Nov 15/77

LOCKHEED
MAINTENANCE MANUAL

TAIL SKID SHOE - REMOVAL AND INSTALLATION

1. Equipment and Materials

Grease, Aeroshell 7, or equivalent

2. Referenced Procedure

29-11-00 Hydraulic Power System - Maintenance Practices

3. Removal/Installation

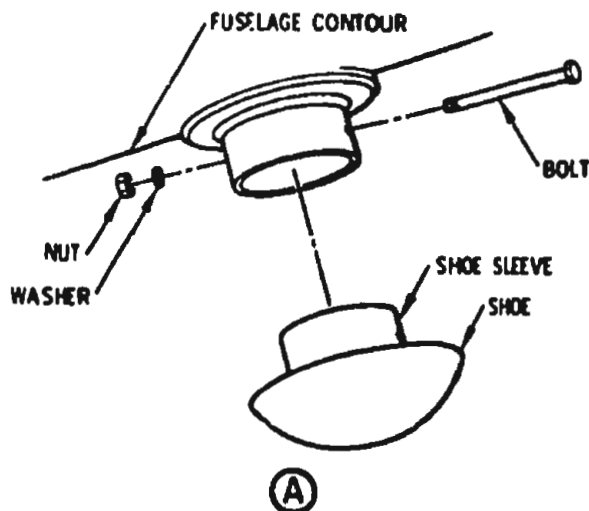
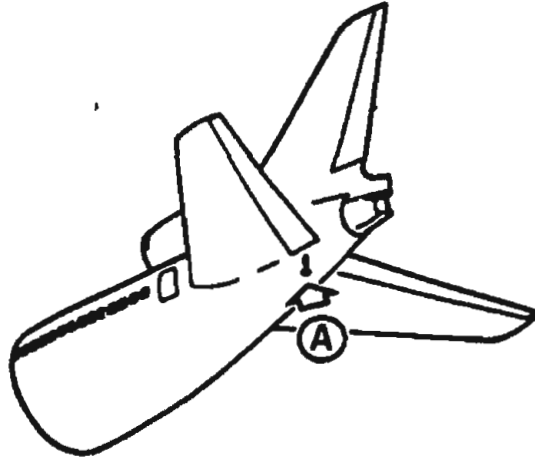
A. Removal

- (1) On Flight Engineer/Second Officers overhead circuit breaker panel CB2, zone 215, open and tag TAIL SKID CONT (F12) circuit breaker.
- (2) Ensure that hydraulic system A pressure is 0 psi (Ref. 29-11-00).
- (3) At tail skid, remove nut, washer, and bolt (Ref. Fig. 401).
- (4) Slide shoe out of tail skid piston.

B. Installation

- (1) Ensure that hydraulic system A pressure is 0 psi (Ref. 29-11-00).
- (2) Coat shoe sleeve with a thin layer of grease.
- (3) Slide shoe into tail skid piston.
- (4) Install bolt, washer, and nut.
- (5) Tighten nut to a torque of 110 to 125 lb in.
- (6) Remove tag and close circuit breaker opened in Step 3A(1).

LOCKHEED
MAINTENANCE MANUAL



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Tail Skid Shoe - Removal and Installation
Figure 401

EFFECTIVITY: ALL

0018

32-71-08
Page 402
Sep 15/80

LOCKHEED
MAINTENANCE MANUAL

R
R TAIL SKID UPLOCK, UNLOCK, RELIEF VALVE FILTER
REMOVAL AND INSTALLATION

R 1. Referenced Procedure

R 32-71-05 Tail Skid Uplock Unlock, Relief Valve - Removal and
R Installation

R 2. Removal/Installation

R A. Removal

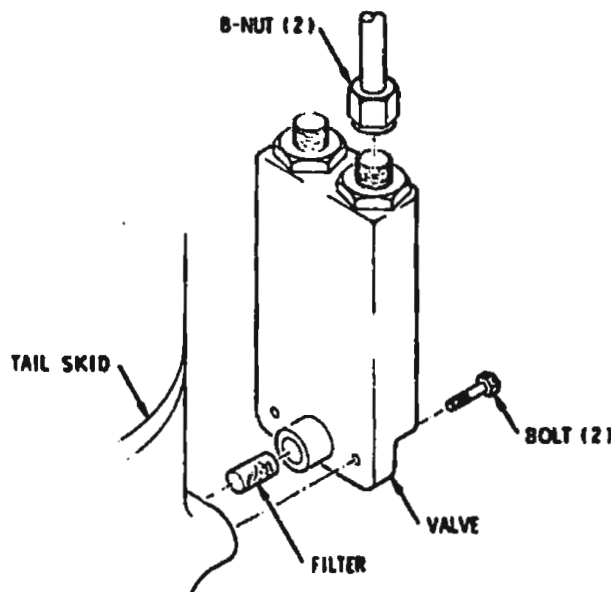
R (1) Remove uplock unlock, relief valve (Ref. 32-71-05).

R (2) Remove filter from valve-to-tail skid port (Ref. Fig.
R 401).

R B. Installation

R (1) Insert filter, closed end inward, into valve-to-tail
R skid port.

R (2) Install uplock, unlock, relief valve (Ref. 32-71-05).



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R
R Tail Skid Uplock Unlock, Relief Valve Filter
R Removal and Installation
Figure 401

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R EFFECTIVITY: 001-018 WITH SB 32-070, AND
R 019-999
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32-71-10
Page 401/402
Aug 15/74

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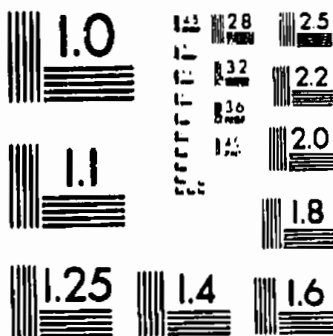
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PRECISIONSM RESOLUTION TARGETS



150 MM

6"

PM-3 8 1/2" x 11" PHOTOGRAPHIC GENERAL TARGET
NBS 1010a ANSI/ISO #2 EQUIVALENT